

Of the more than 1,000 species of North American freshwater fish parasites, only a few are known to infect man, and those rather rarely. The broad fish tapeworm, *Diphyllobothrium latum*, is the most common fish parasite that infects man in North America but its range is very limited in the United States, and has not been found in Nebraska. This tapeworm, as all other fish parasites, is killed by ordinary cooking methods. Hot smoking methods also kill fish parasites but some survive the cold smoking procedures.

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Fishing is one of the most popular participation sports in Nebraska. Each year, close to a quarter million fishing permits are issued to residents and visitors. And, the anticipated outcome of any fishing trip for novice or veteran is a lip-smacking fish fry.

Occasionally, though, anglers may hook a fish that shows signs of infection or parasitism. Before throwing the fish away, check it carefully. Most are healthy, and studies have shown that very few fish diseases can be transferred to man. Virtually all fish are okay when thoroughly cooked, smoked, or frozen.

This leaflet should help identify most of the conditions of those occasional fish that show signs of disease or parasitism. Generally, a fisherman will see the results of an infection or parasite rather than the organisms themselves. Consequently, these visual characters or signs are cited to assist in identification of the infective agent.

Parasitism is a way of life. It exists in the plant kingdom and in practically every major group of the animal kingdom. A parasite is an organism that lives in or on another larger organism of a different species (the host) from which it derives nourishment. Depending upon the particular parasite, the relationship may be temporary or permanent. Some parasites can cause disease and thus become economically important. Damage can be caused in a number of ways — by blocking passages, by penetrating walls, by diverting part of the food supply, by allowing secondary infections, and by other means.

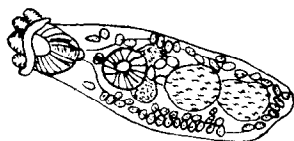
There are nine major groups of parasites and disease-causing organisms found in Nebraska fishes. Parasites seldom harm their hosts, except when they are quite numerous or the fish is under stress from some other cause.

Viruses and bacteria cause several diseases. While these minute microorganisms cannot be seen with the naked eye, an angler can spot the symptoms, which range from "pop-eye" to swollen, bloody fins.

Commonly found in fresh water, **fungi** are thread-like plants that lack chlorophyll. These parasites do not attack normal, healthy fish. However, if a fish is injured and its protective mucous coat is removed, a fungus growth could eventually cause its death.

Small, single-celled organisms called **protozoa** may cause a variety of fish diseases. They can be found in cysts on the gills, embedded in the flesh, or free on the surface of the body. Some protozoa can be seen with a magnifying glass, while others necessitate the use of a microscope.

**Trematode
or Fluke**



The larval stage of several **trematode worms or flukes** is usually found in cysts in the flesh or on the internal organs. However, they can also occur in the eye and other parts of a fish. Although potentially harmful to some fish-eating animals, flukes are not dangerous to man if the fish

is prepared properly. Adult flukes can also be found in many organs of a fish, but they will seldom be seen unless one specifically looks for them.

**Cestode
or Tapeworm**



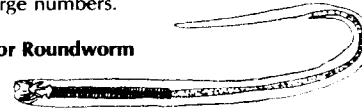
A variety of larval and adult **cestodes or tapeworms** infect many Nebraska fishes. Larval tapeworms are found in cysts on or in the internal organs or free in the body cavity. Adult tapeworms inhabit the intestines, and these white worms can be seen when an intestine is accidentally slit in cleaning.



**Acanthocephalan
or Spiny-headed Worm**

Fishermen will seldom see an **acanthocephalan or spiny-headed worm**. The adults normally live in the intestine, although one species may sometimes be found in the body cavity with its head buried in the intestinal wall. Larval acanthocephalans occur as white cysts attached to the internal organs. While not harmful to man, spiny-headed worms may cause injury to the intestine of a fish if present in large numbers.

Nematode or Roundworm



One of the most common parasites found in fish, **nematodes or roundworms** sometimes occur in great numbers. The larval stage may be found in cysts or coiled on or in the internal organs. Adult roundworms generally attach themselves in the intestine, although some may coil under the skin in the head area or on the fins.

Leeches may be external, blood-feeding parasites. They may adhere to almost any part of the body, but seem to prefer the fins. Leeches will leave small circular wounds, which may become infected with bacteria or fungi. They do not harm the flesh and can simply be discarded when a fish is cleaned.

A highly diversified group of parasites, **copepods (small crustaceans)** are found embedded in the flesh, attached to the gills or mouth, or moving freely over the surface of the body. If they occur in large numbers, some species can kill young fish. Other species open wounds in the body, making the fish susceptible to bacterial or fungal infection.

HELPFUL HINTS

After examining a fish and removing the useable flesh, care should be taken in disposing of the remains. Don't throw the body back into a lake or stream. Some parasites can continue their life cycles if they are returned to water. If fishing on a state-operated area, follow posted instructions or place the remains in the drums supplied for waste. On private land, ask permission to bury the remains. If the fish is cleaned at home, dispose of the fish in the normal manner.

HANDLING FISH

Fish secrete a protective mucous coating which helps prevent fungal and bacterial infections. If this mucous coat is damaged, the fish becomes much more susceptible to infection.

Size limits are now in effect on some fish species in Nebraska, and it behooves anglers to take extra care when returning under-size fish to the water. The mucous coat probably will not be harmed if a hook is removed while the fish is still in the water or if the angler wets his hands before handling the fish. In addition, the fish should be released gently after the hook is removed, rather than tossed into the water.