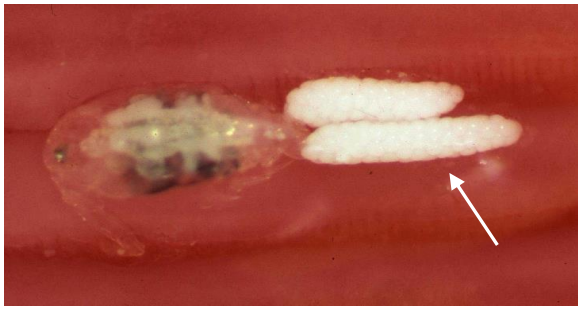
Ergasilus sieboldi

National Fisheries Services

What is Ergasilus sieboldi?

Ergasilus sieboldi is a non-native crustacean (copepod) parasite. It is commonly known as the 'gill maggot' due to the presence of long white egg sacs that trail behind the body. Each parasite measures over 1mm in length and can be seen with the naked eye.

E. sieboldi infects the gill filaments of a wide range of freshwater fish species using two, large pointed antennae. It has a life cycle with many stages, but only the adult females are parasitic.

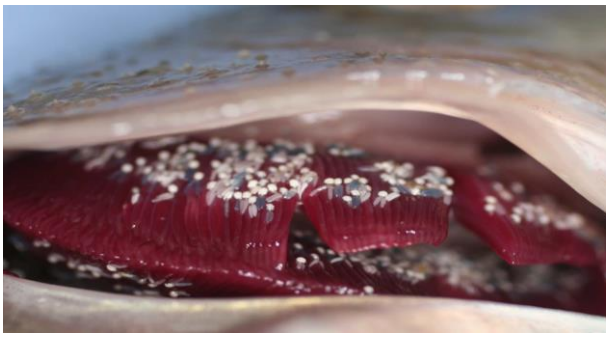


Ergasilus sieboldi with its long white eggs sacs (arrow).

What does Ergasilus sieboldi do?

Ergasilus sieboldi attaches to the outer surfaces of the gill filaments. Its specialised antennae are inserted deep into the gill tissue. This allows the mouth (located on the underside of the body) to come into close contact with the gill surface. E. sieboldi feeds on epithelial cells, blood and mucus. These are scraped from the gill surface by serrated blades that surround the mouth.

Every year E. sieboldi causes mortality in freshwater fisheries, with large tench (Tinca tinca), common bream (Abramis brama) and rainbow trout (Oncorhynchus mykiss) most commonly affected. Large infections of E. sieboldi will reduce the surface area and function of the gills.



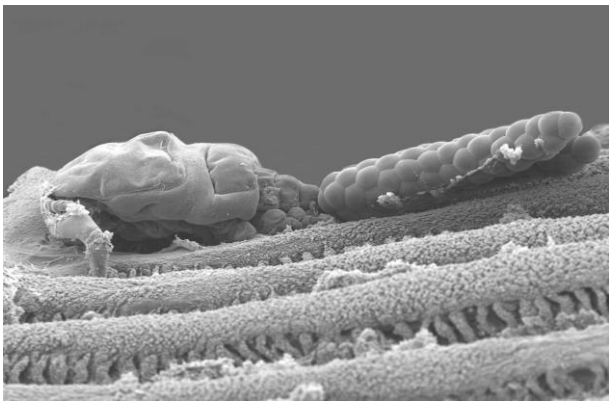
Heavy infections of Ergasilus sieboldi on the gills of a common bream.

Trout heavily infected with Ergasilus sieboldi showing severe condition loss.

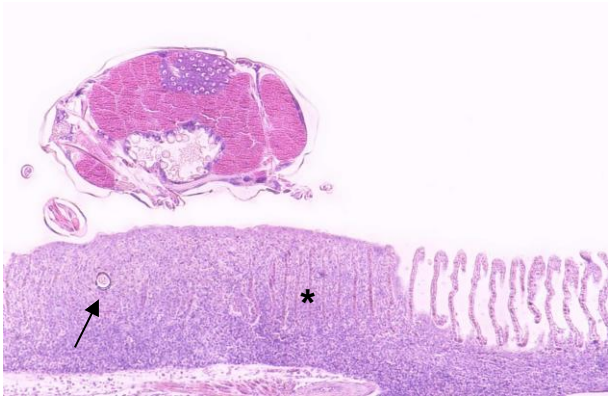
This causes respiratory distress and loss of normal osmoregulatory function. Heavily infected fish often show signs of condition loss, slowed growth and lethargic (sluggish) behaviour. They are likely to become more susceptible to secondary diseases, such as bacterial infection. They are also less tolerant of environmental changes (such as low or fluctuating oxygen levels), which are typical during the summer. Heavy parasite infections can also reduce over-wintering survival of the host fish. E. sieboldi can therefore cause serious disease problems in freshwater fisheries by reducing fishery performance and causing mortality.

Pathology caused by Ergasilus sieboldi

The way in which Ergasilus sieboldi attaches and feeds cause considerable pathology to the gills. The insertion of the antennae deep into the gill tissue causes deformation of the gill filaments and puncturing of blood vessels. The combination of attachment and feeding exerts pressure on the gill filaments. This leads to compression and erosion of the surface epithelium, cell necrosis, constriction of blood vessels and hyperplasia (cell multiplication). Heavy infections of E. sieboldi cause loss of normal gill structure and disruption to the flow of blood throughout the gill. This results in severe respiratory problems



An electron micrograph of Ergasilus sieboldi attached to a gill, allowing the body and egg strings to lie along the filament.



A histology image of an Ergasilus sieboldi attached to the gills. The antenna is inserted into the tissue (arrow) causing hyperplasia (*).

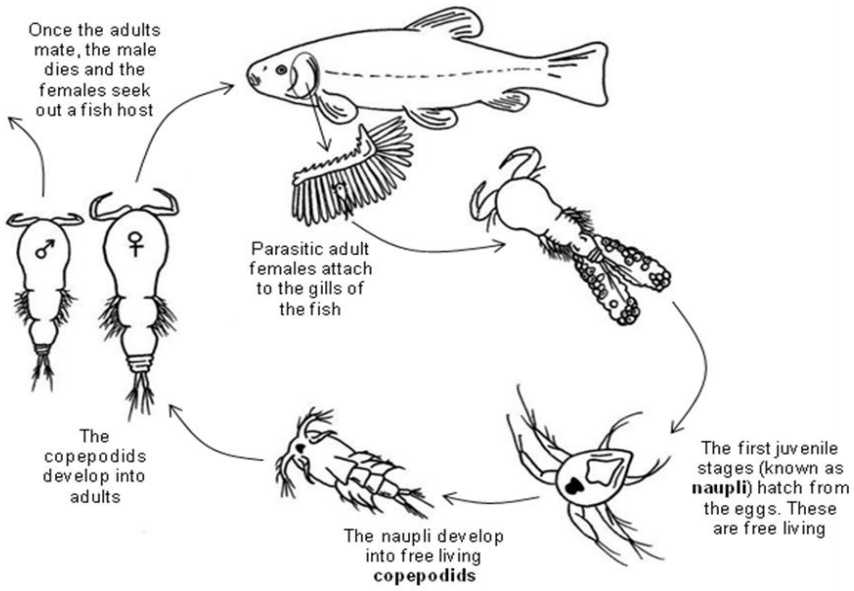
Epidemiology

Ergasilus sieboldi infects a wide range of freshwater fish species. However, tench common bream (Abramis brama), pike (Esox lucius), brown trout (Salmo trutta) and rainbow trout are more susceptible. E. sieboldi has a preference for larger fish, in particular those greater then 15cm in length. Although they have a strict preference for the gills, E. sieboldi may also be found on the fins, body surface and in the nasal cavity.

E. sieboldi infections are seasonal with parasite populations peaking during late summer and autumn. Due to this seasonality, there are different risks linked with infection at different times of the year.

The life cycle of Ergasilus sieboldi

The life cycle of Ergasilus sieboldi involves a number of free living stages before the adult females become parasitic. The free living stages feed on algae in the water and develop into mature adults in a few weeks. The females live for approximately one year and can over-winter on fish. Each female can produce three to five clutches of eggs (with approximately 220 eggs per clutch) each year.



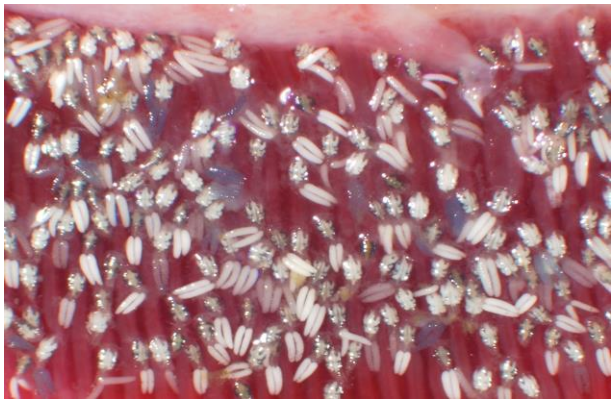
The life cycle of Ergasilus sieboldi.

The life cycle of E. sieboldi is very temperature dependant. Parasite reproduction starts in spring (eggs start to hatch at around 8oC) and continues into late autumn. At relatively low temperatures (12-15oC) it can take approximately 10 weeks for the parasite to develop from an egg to adult. However, this is reduced to 22 days in warmer conditions. Infection levels increase throughout the year.

Protecting your fishery from Ergasilus sieboldi

As Ergasilus sieboldi causes so much damage to fisheries, we may restrict movements of fish from infected waters. The best way to protect your fishery from the introduction of non-native parasites is to limit fish stocking activity. But if you do have to stock, getting your fish health checked before stocking will help minimise disease risks. Once established in a fishery, there will be millions of free living stages of the parasite within the water. E. sieboldi can therefore be spread with infected water, plants and angler's equipment. It is therefore important that you maintain good biosecurity to reduce the risk of infection.

Heavy infections on the gills of a tench following a mortality of large fish in a stillwater fishery.



Ergasilus sieboldi smothering the gills, showing varying stages of egg-string development.

If E. sieboldi is already present in your fishery, there are a number of measures that you should consider to limit disease problems. The most effective way of reducing the impact of the parasite is through good fisheries management. Chemical treatments cannot be used to remove the parasite and its free living stages. The only way to eradicate it would be to de-stock, drain and lime the fishery. This is often very costly, undesirable and impractical. Fishery management measures include:

Maintaining low stock densities

One of the most important factors influencing infections of E. sieboldi is the number and availability of susceptible hosts. High stock densities make it easier for the parasites to find new hosts to infect. This will help increase the number of parasites in the fishery, especially during warmer conditions when parasite development is at its greatest. By carefully managing the fish stocks you can help minimise the impact of the parasite whilst maintaining angler satisfaction. This requires knowing the fish species present in the fishery, maintaining awareness of stock density and in trout fisheries, promoting rapid stock turnover at certain times of the year.

Carefully managing fish stocks

Because E. sieboldi can infect a wide range of fish species and also has a preference for larger fish, it means that these species can support parasite populations in the fishery. Therefore, removing or reducing the number of these species will help limit the parasite population and over-wintering success of individual female parasites.

Maintaining good water quality

As E. sieboldi causes damage to the gills, maintaining good water quality is essential. Keeping dissolved oxygen levels high, particularly during warmer conditions, will make it easier for infected fish to respire. This will help reduce the impact that the parasite has on the fish and help keep the fish healthy.

Removing obviously sick fish

Removing fish that are badly infected will not only benefit the fishery, but will also help to remove a large number of parasites at the same time. Fish with problems in the gills will often congregate near an inlet, at the water surface or in areas where there is greatest water flow. Regularly removing these fish will also allow you to closely monitor infection levels.

For trout fisheries, there is more information on managing E. sieboldi infections using stock management in the ‘Managing Ergasilus sieboldi in trout fisheries' fact sheet. There is also more information on Category 2 and novel parasites, as well as general advice on how to prevent disease outbreaks in your fishery and fishery biosecurity in the 'Non-native and novel parasites' and ‘Fish health and fisheries management’ fact sheets.

Good biosecurity and care over fish stocking are essential to protect healthy fisheries.

This fact sheet has been produced by:

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