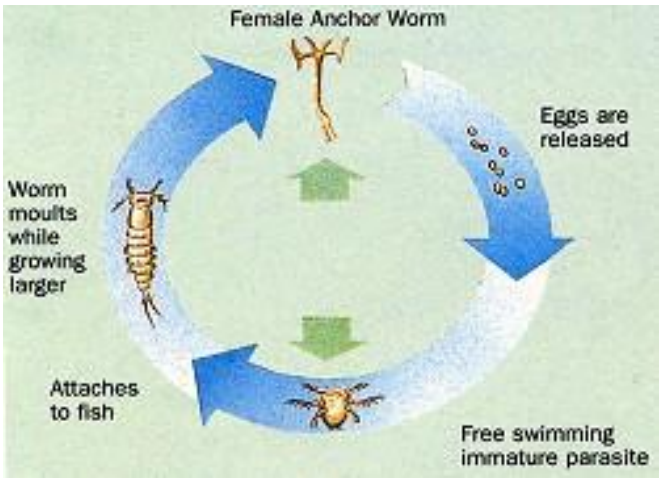
Anchor Worm

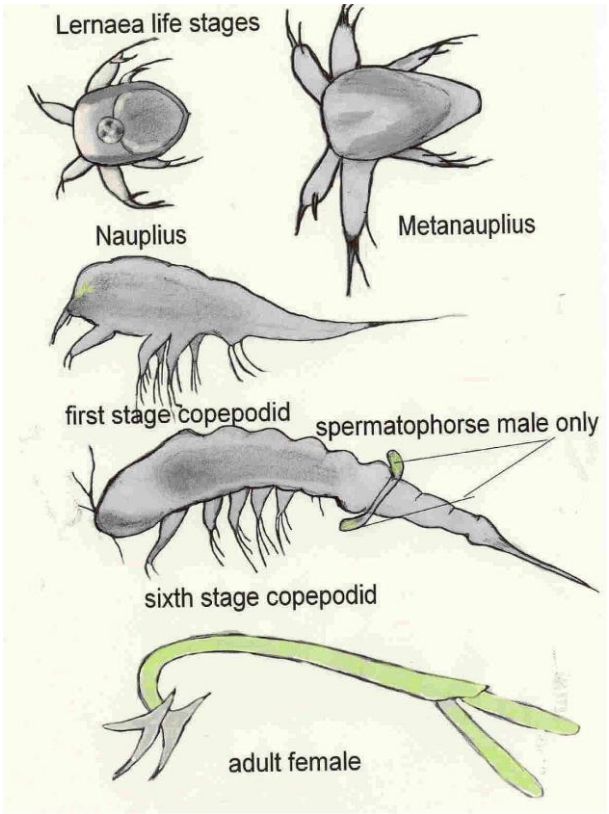
Also known as Lernaea Elegans. The family name is Lernaedae. This parasite earns its name because it develops to look like the shape of anchor, this is to prevent it being easily pulled out or dislodged. This anchor embeds into the gill or body of the host fish. It feeds on the tissues of the koi. Due to this the anchor worm can cause a serious amount of tissue damage to the host. Lernaea are crustaceans, they are a member of the Copedoda genus which are related to crabs and lobsters. When carrying egg sacks it looks like a Y shape.



Lifecycle

It has an extremely complex life cycle with numerous development stages where it will shed its hard exoskeleton in order to grow. Both male and female anchor worms reach sexual maturity in their sixth growth stage, this is where mating occurs. The male never goes past this sixth stage of development. At this stage he will have developed two sacks named "*spermatophorse*" which he then deposits onto the female genitalia. Having made his deposit, he then falls away and dies. The female, having received her deposit, then finds a host where she then embeds herself into the skin.

The lifecycle starts off with the eggs hatching, these hatchlings are called "*Nauplii*" which are oval shaped and approx. 150 microns in size. In 2 to 3 days the first shed will take place and the hatchling will develop into the next stage called "*Metanauplii*". It will be a little larger and again, has a hard outer shell made of a substance called "*Chitin*". After a couple of days, the first thoracic stage will be reached, this is the first "*Copepod*" stage and the anchor worm will have reached approx. 250 microns in length. It will also have two pairs of legs used to swim. This is the crucial stage where it must find a host within 2 to 3 days or it will die.



Having found a host, the next transformation takes place. The Lernaea begins shedding up to the fifth stage, during these sheds it gains another thoracic section with another pair of legs. As mentioned earlier, the sixth stage achieves sexual maturity with the female developing ovaries and the male testes. Copulation takes place and the male drops off the host and dies. After mating takes place the female burrows her head into the skin of the host fish. At full size she can reach 1 to 1.5cm in length.

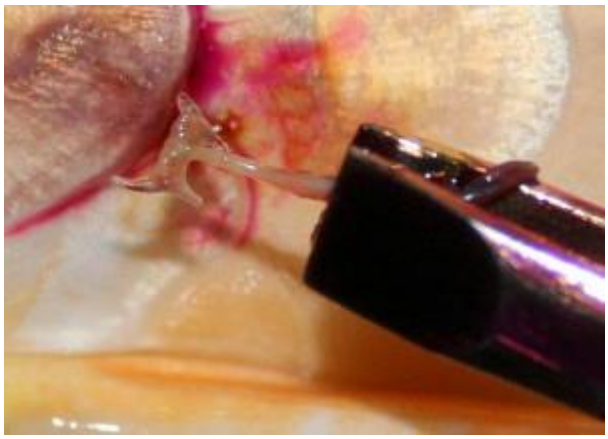
Their lifecycle can take around 25 days in temperatures of 20°C. The optimal temperature range for Lernaea is 26 to 28°C. In temperatures of 8 to 15°C, Lernaea cannot shed/grow. Below 8°C the developmental changes will not take place and both the larvae and adults will die. The exception is that Females on a host or eggs, are able to survive winter temperatures. Eggs will eventually hatch when conditions become suitable.

Symptoms

A raised ulcer commonly develops at the site where the Cephalic horns (Anchors) are embedded. These anchors may become embedded into vital organs like the heart, liver, brain or gills. If this is the case serious damage may be done, it may even cause death. The size of the affected fish would be a factor to consider when anchor worm is found. Secondary bacterial and fungal infections may occur. When Lernaea is in its larvae form it may cause the fish to produce excess mucous and flashing. The host fish may become lethargic and have a decreased respiration rate (slow gill movements).

Identification

This is easy as the parasite is easily seen with the naked eye. It can reach sizes of up to 8mm. All anchor worms that are found embedded into the host fish are females.



Treatments

Any fish that have anchor worms attached should be moved to a quarantine tank immediately to stop any eggs being released into the pond.

The anchor worm needs to be removed manually using a pair of tweezers. In order to prevent the fish wriggling about and becoming stressed, the best course of action would be to

sedate/anaesthetise it. Once the fish is adequately sedated the worm can then be carefully removed. It is vitally important that all of the parasite is removed. This will help reduce infection as you will have not left any parts in to decompose.

To help encourage the anchor worm to release its grip a potassium permanganate (PP) solution/paste can be applied to the worm and immediate area where it is embedded. This will make it easier to remove it in one piece.

After successfully removing the anchor worm, the wound should be treated topically with antiseptic. This will help reduce the rate of developing secondary infections. It may be beneficial to apply propolis to the area too.

Lice-Solve: Has been found to kill all stages of Lernaea in 48 hours.

Anchor worm will die if their environment is dried out. Drain the pond and filters etc and allow to dry for at least 24 hours.

The most effective chemical treatments are classed as organophosphates. This means they are extremely difficult to get hold of and are not available to buy. Dimilin, Masoten and Malathion. These chemicals are banned in the UK.

Masoten: 1 gram per 87 UK gallons per week for four weeks with a temperature of 18.3°C should get all life stages. Below 18.3°C use 6-8 grams per 1000 UK gallons.

Salt: For Koi and sterlets a 1.5% bath (15 grams per Litre) for 15 to 30 minutes will usually kill most parasites and remove gill mucous. A solution of 1.8% (18 grams per Litre) for 20 minutes will kill Anchor worm. Always observe fish during treatment and remove them at the first signs of distress.

Warnings

Before adding any treatments, it is essential that you make a positive identification of the parasite causing the problems.

Test your water parameters for Ammonia (NH_3), Nitrite (NO_2^-), Ph, KH and Temperature.

Any treatments added are done so at your own risk. It is your responsibility to know your pond volume and to calculate dosages correctly. Always check the product labels. Turn off UVs if it states to do so. Add extra air.

The YKS will not accept responsibility for deaths of stock resulting from incorrect usage of chemicals/medication.

Videos

https://youtu.be/6mSxITddUm4
https://youtu.be/yskQSsh9cG4
https://youtu.be/2S10MbapaJo
https://youtu.be/kkVLLdmuark

References

https://www.allaboutkoi.co.uk/anchor-worm-a-14.html
http://www.koiquest.co.uk/para.html
https://www.slideshare.net/jclargado/lernaea-32083965
www.pond-life.me.uk/fishhealth/lernaea
http://absolute-koi.com/subcat528.html