

Heart worm disease:-

Etiology:-

- It is caused by the third stage larvae (larva migrans) of amplicaecum nematodes.
- They about 3 cm in length so, can be seen by naked eyes.
- They attached to the sinus venosus of the heart.
- On severe infestation, they present in branchial cavity or extend to the abdominal cavity
- The larva migrans are non capsulated in the tilapia, while they are encapsulated in predatory fish as mode of defense mechanism

Epizootiology:-

- Aquatic birds, water snakes & crocodiles act as final host, crustaceans act as first intermediate host and fish serve as second intermediate host
- This disease mostly spread among tilapia, *Lates niloticus* & catfish in lake Nasr.
- Its prevalence in tilapia is about 30-70 %, while is 10-30 % in predatory fish.
- Density of infestation (number of worms/fish) is about 5-35/fish.
- Prevalence increases with increasing the fish size.

Diagnosis:-

1. Presumptive diagnosis:

A- Case history:

Presence of final hosts, wild fish and clinical abnormalities.

B- Clinical signs:

- 1- Nervous manifestation (due to pain as a result of their attachment to the heart chambers).
- 2- Slight abdominal distention

3- Anemia.

4- Emaciation.

5- Reduced vitality.

C- Post- mortem lesions:

♣ Detection of visible long, cylindrical white to creamy larvae with redness at their anterior end, attached to the sinus venosus of the heart & extend into branchial or abdominal cavity.

♣ Dislocation, compression & ulceration of internal organs.

D- Definitive diagnosis:

♣ Identification of the causative larvae after their fixation with 5 % formalin is essential.

Prevention:-

♣ Under natural conditions prevention is impossible & unpractical.

♣ Under cultural conditions:-

1- Quarantining the newly purchased fish

2- Prevention of crustaceans from access to fish ponds through filtration of water inflow.

3- Prevention of access of aquatic birds, water snakes and reptiles to fish pond.

4- Periodical drainage, drying & disinfection.

Control:

♣ Under natural condition, control is impossible & unpractical.

♣ Under cultural conditions:-

1- Elimination of water snakes & aquatic birds from fish farm.

2- Drainage, drying & disinfection for elimination of first intermediate host are essential before restocking.

4- No therapy for encysted or free larvae.

Leechiosis

It is metazoal parasitic disease of fish caused by aquatic leeches.

Etiology:-

- ♣ Aquatic leeches, belong to phylum Annelida (ring worm), class Hirudinea.
- ♣ They have long, slender, segmented, flexible bodies.
- ♣ they have 2 suckers, oral sucker for feeding and posterior one for attachment to the external body surface (skin, fins & gills) of fish.
- ♣ They are hermaphrodites & have complete digestive tract.

Epizootiology:-

- ♣ They are worldwide in distribution.
- ♣ They affect freshwater, brackish & marine fishes.
- ♣ Crowded cultured fish are more susceptible than wild ones.
- ♣ Young fish & those have reduced vitality are highly susceptible.
- ♣ Some of Aquatic leeches have no host specificity, and others have some degree of host specificity.
- ♣ They spread in summer.
- ♣ They have direct life cycle.
 - Adults produce cocoons which are deposited on the aquatic vegetations, rocks & snails.

- Juveniles leeches hatch from cocoons.

Pathogenesis

- ♣ Both mature and immature leeches are blood sucking
- ♣ They are temporary or semi-permanent parasites.
- ♣ They leave the host after one or successive blood meals.
- ♣ They are more active in dark than in light.
- ♣ Aquatic leeches feed on the blood of vertebrates & invertebrates.
- ♣ **Aquatic leeches cause considerable damage to their hosts due to:-**

- 1- Blood sucking which cause reduction in host vitality.
- 2- Causing round reddish inflamed areas on the external surface of their host.
- 3- Opening portals of entry to secondary pathogens which increase susceptibility of fish to opportunistic pathogens.
- 4- Transmission of hematoprotezoans.

Diagnosis:

A- Presumptive Diagnosis:

1. Case history:-

Summer season, clinical abnormalities & presence of hard objects

2. Clinical signs:

♣ The attacked fish show:-

- 1- Restlessness & nervous swimming
- 2- Rubbing against hard objects.
- 3- Small rounded cut wounds (parasite print) are seen on fish skin.

4-Petechial hemorrhages & focal inflammations can be seen on fish skin.

5-The parasitic leeches can be seen by naked eyes as long, slender objects having segmented bodies on the external surface of the fish body.

Prevention:

♣The disease can be avoided through:-

- 1- Quarantining of live food & vegetations.
- 2- Getting rid off snails & Vegetations before fish stocking.
- 3-Filtration of water inflow with sand or gravel filter.
- 4-Drainage, drying, & disinfection of wet spots in ponds with quick lime are useful before fish stocking.

Control:

This can be done by application of:-

- 1- Masoten or metrifonate is added to the water in presence of fish for killing the worm, not the embryos in cocoons.
- 2- Sodium chloride can be used.
 - ♣This is effective in removing freshwater leeches from fish as it paralyzes leeches, so drops off the fish.
 - ♣Treated fish must be transported to clean pond.
- 3- Drainage & disinfection with chlorinated lime, then drying for 2 weeks post lime treatment to eliminate various life stages of the worm are essential.

principles of disease prevention & treatment

A-Principles of disease prevention

(1) Fish immunization or vaccination

-It considers the most effective method for prevention especially in case of bacterial and viral diseases.

Char. of good vaccine:-

- 1-Effective, safe, relatively inexpensive and easy to be applied.
- 2-Stable in environment temp.
- 3-Of short -ve phase.

precautions

- 1-Only vaccinate healthy fish.
- 2-Determine antibody titer before vaccination to avoid neutralization.
- 3-The water used in vaccination should be the same water holding fish.
- 4-Make sure that the conditions of the vaccine solution are suitable for the fish, the solution should be well oxygenated and at correct temp.
- 5-The fish should not be stressed by the procedure.

Methods of vaccination

1-Immersion and bath techniques

Bath: the vaccine is diluted and fish spend several hours in the preparation

Immersion: is quicker requiring 30-120seconds exposure to vaccine solution.

2-I p injections (parental)

Produce high antibody titers to numerous bacterial and viral pathogens.

3-Oral via food

4-Spraying or showering

(2) Quarantine

-Isolation of newly arrived fish in isolated pond.

-The isolation period should be at least as long as the incubation period of the suspected disease for detection of any gross signs that will indicate presence of disease, so quarantine is important to prevent the introduction and transmission of disease to the farm.

(3)Control of wild fish

By placing wire-mesh screens over the water inflow as they carry many pathogens.

(4)Stocking density

Avoid overcrowding fish at any time and particularly during hot weather.

(5)Age segregation

As old fish are generally infested by parasites, which they can easily transmitted to young individuals.

B-Principles of disease treatment

(1)Chemotherapy

Routes

1-External treatment

II-Internal treatment

1-External treatment(water borne route)

It is the most common method mainly for external body surface pathogens (disinfectants)

Adv:-

Easy administration and non stressful.

Disadv:-

- 1- Non accurate dose .
- 2-Most drugs added to water are unstable and quickly degrade.
- 3-May require repeating and water change to remove the inactive and toxic by-products of the drug
- 4-Inhibit the nitrifying bacteria → increase level of ammonia and nitrite

General characters of drugs used for external treatments.

- 1-Water soluble or suspend at therapeutic concentration for long time
- 2-Safe to fish (the ratio between LD to pathogen and that to fish 1-4)
- 3-Cheap and available.
- 4-Does not leave toxic residues in the flesh of treated fish.

General precautions

- 1- Bioassay test before treatment
- 2-Fasting for 24 hours
- 3-Note the reversal relationship between the concentration of therapeutic disinfectant and the exposure time
- 4-Accurate calculation of the dose
- 5-Using plastic basket for mixing and not use galvanized containers
- 6-Notice fish continuously during period of treatment
- 7-Repeat the treatment if necessary, but after 30 hours

Methods of external treatment:

1-Dipping

- Very short time (few seconds) with high drug concentration
- The fish are handled through holding facility such as nets for exposing to dipping pond, after dipping the fish should return rapidly to clean water

2-Bath

Precautions:

1-The treatment should be done in a separate container especially in long term bath because the concentration required for effective bath treatment is toxic to nitrifying bacteria

2-All drugs should be completely dissolved and mixed in water before adding fish

3-In weak individuals or sensitive species, it is better to give multiple treatments of lower recommend dose rather than a single higher dose

3-Flush

The measured amount of drug is added at inlet and passes through the system as a pulse then get out from outlet.

precautions:

1-Bioassay test

2-should know the water flow rate in the holding facility

3-Water flow is not stopped

II -Internal treatments

1)Oral treatment or oral medication

Adv

1-One of the best ways as they are the least stressful

2-Very effective if consumed in the proper amounts and absorbed by GIT

Disadv

1-The sick fish will often not eat

2-When add drug to food may become unpalatable even for healthy fish ,but fasting the fish 12-24hours may increase the acceptance.

Methods

1-Commercially medicated feeds as antibiotics medicated feeds

2-Injection of individual food items

The required dose is injected into a small fish which is then fed to the sick fish

Disadv.

a- Not all sick fish will accept this preparations

b- Only large carnivores fish can be treated

c- There is a risk of introducing other diseases with the medicated fish

3-Loading food with medication (life encapsulation)

Artimia can be loaded with therapeutic levels of drug by soaking in a drug solution

4-Preparation of a medicated artificial diet

2)-Injection

Accurate dose, but highly stressful used mainly for valuable fish and few numbers of fish

Methods

1-I/p

Fish should be fasted 24 hours before injection to avoid peritonitis which caused by puncture of the stomach or bowel

site:

I/P injection can usually be given anywhere from midway between the pectoral and pelvic fins

2-I/m

used only in fish more than 13cm long

site:

The best site is dorsal musculature just lateral to the dorsal fin

(2)Destruction of link of disease transmission

The destruction of intermediate host or hosts which may be snails, crustacean invertebrates, amphibians or aquatic birds represent the actual control for fish disease especially the parasitic diseases.

(3)Eradication of diseased fish

This method can be used only in high economic countries, also used in small scales as in aquarium fishes

Pharmacopoeia

1-Antibiotics

Uses:-

-Treatment of bacterial infections

N.B You must apply antibiotic sensitivity test before treatment.

Examples:-

- **Oxytetracycline**
- **Amoxicillin**
- **Enrofloxacin**
- **Sulfamerazine**
- **Antired**

Chemicals

(1)Alum (aluminum sulphate)

a-Decrease turbidity in ponds

b-Acidifier

(2)Activated carbon

- Removal of medications, organics , colored and other foreign substances from water

(3)Na-phosphate (acidifier)

(4)Agriculture gypsum

a- ↑PH and ↑hardness for certain species which required hard water

b-Decrease turbidity

(5)-Copper sulphate

Uses:

a-Treatment of protozoan ectoparasites

b-Copper is effective against columnaris, bacterial gill disease and water mold infections in cold water species

c-It is algicidal and used for eradication of snails

precautions:

1-Dissolve it before use

2-Used in fresh water not used in marine water with high calcareous materials as coral or lime stone where they react with copper and form copper carbonate which is insoluble

3-Should change water after use

disadv

1-Immunosuppressive

2-Toxic to gill tissues

3- It precipitates In fish and reach to human

6)Formalin

Uses:

1-Treatment of protozoan and metazoan ectoparasites

2-Treatment of water mold infection on eggs but not treat eggs with in 24 hours of hatching as it will concentrate in the shell killing the embryo

3-Disinfectant: 27-220ml/l formalin equal to 1-8 % formaldehyde used for nets and other utensils ,rinse utensils well before use

Disadv.

1-It causes contact hypersensitivity and lung damage in human and highly carcinogenic ,the solution should not allowed to contact with human skin

2-Irritant for gills, and water should be aerated during treatment

precautions

1-Bioassay test

2-Should wear gloves

7)H₂O₂

1-Treatment of acute environmental hypoxia

2-Parasiticide for protozoan ectoparasites

3-Fungicidal for water mold infections of eggs

8)Pot. Permanganate

Uses

1-Treatment of ectoparasites and skin /gill bacterial infections in fresh water

2-Detoxification of hydrogen sulphide

precautions

1-Bioassay test

2-Not used in sea water as Pot .Per. is reduced to manganese dioxide which precipitate on the gills and not used in ponds with high organic matters.

3-Dissolve it before use (freshly prepared)

4-Not mixed with formaline

5-Short term bath is recommended as it is unstable in water

(9)Salt (Nacl)

1-Treatment of Ichthyophthirius

2-Treatment of fresh water ectoparasites, columnaris, and bacterial gill disease

bath: 10-30 gram salt /l treat for 30 minutes

-A salt bath can remove excessive mucous and debris associated with ectoparasites, columnaris, and bacterial gill disease facilitate the effectiveness of other chemicals against these pathogens

3-Treatment of water mold infection

4-Increase salinity in brackish and marine aquaria

10)Malachite green

-For external protozoa and mycotic diseases

-Very toxic and carcinogenic

-Should wear gloves

-Not used in table fish

11)Quick lime(unslaked lime)

1-Pond disinfectant

2-Adjusting pH and the hardness of pond

12) Sod. Thiosulphate

Neutralize chlorine in water.

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