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Bacterial Fish Diseases

Motile Aeromonas Septicemia (MAS)

Also named Hemorrhagic Septicemia or Motile Acromanad Diseases or Red Sor Disease or Red Mouth Disease and Infectious Dropsy

Definition:

It is acute or subacute or chronic infectious disease of all freshwater fishes caused by motile aeromonas bacteria, characterized by rapidly fatal septicemia with few gross signs, exophthalmia, ascitis and ulcer formation.

Causative Agent:

This disease is caused by motile Aeromonas groups, gram negative, non-spore-forming.Main causative agent is *Aeromonas hydrophilia* present as normal flora in the aquaculture and intestine of fish as non pathogenic strain but under certain circumstance it will be pathogenic either increase in number of the bacteria or immunosuppression of the fish in case of change of normal water quality or decrease in food or sudden changes in temperature.

The optimum growth temperature is 28^{o}C, but growth can occur at 37^{o}C. Colonies on nutrient agar are white to pale pink, round and convex, with entire margins.

Susceptible species:

Most cultured and wild fish are susceptible to infection with *A.hydrophila* such as carp, channel catfish, eel, goldfish snakehead fish, rainbow trout, brown trout and tilapia.

Predisposing factors: include

1. high temperature.
2. overcrowding.
3. reduction of oxygen.
4. malnutrition.
5. heavy infestation with parasites.
6. organic pollution.
7. high ammonia and nitrite level.
8. injuries or damage of the skin and gills.
9. spawning activity.
10. rough handling and transportation of fish.

These factors play an important role in lowering the resistance of fish body so fish become more susceptible to take the infection with motile Aeromonas septicemia.

Transmission of the disease:

The etiological agent is transmitted horizontally. It is distributed widely in water and sediments of ponds and can be transmitted by discharge from the intestinal tract and external lesions on the skin.

Parasitic damage and fungal infection of the epidemic may allow the entry and spread of infection among fish, Carriers also play an important role in transmission of the infection.

Incubation period:

The incubation period between initial infection and appearance of disease signs is dependent upon the temperature of the environment. Acute cases may appear with 4-10 days after infection. Subacute or chronic cases may take much longer to develop.

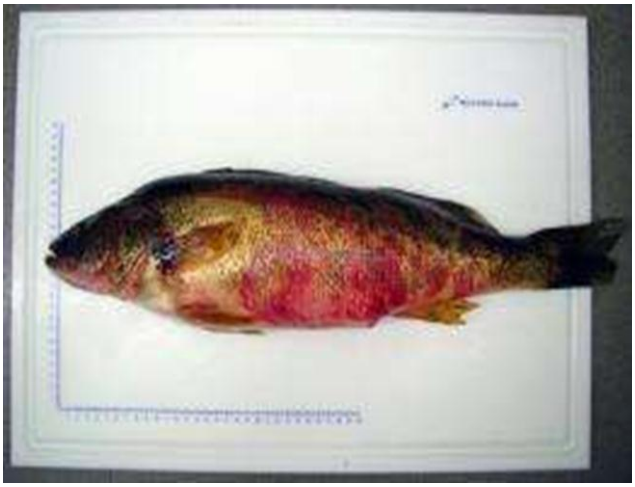
Clinical Signs:

Clinical signs:

The disease has two forms:

1. Acute form (dropsical form): This form is characterized by a rapidly fatal septicemia with few gross signs of disease. Exophthalmia, reddening of the skin and accumulation of the fluid in the scales pockets and the abdominal cavity.This occur at spring as the environmental temperature begin to elevate, the mortality rate is 80-90%

2. Chronic form or ulcerative form: The predominant clinical signs include, dermal ulceration with focal hemorrhages and inflammation. Both dermis and epidermis are eroded and the underlying musculature becomes severely necrotic. Also severe tail and fin rot showed on the infected fish. This form occur in summer usually the mortality rate 30-40%



Pathological Lesions:

Petechial hemorrhage in the peritoneum in case of acute form. hemorrhage in intestine and congestion of visceral organs specially the liver. The liver enlarged and congested with focal necrosis and in some cases the color became brown to yellowish. The anterior kidney is enlarged and congested.

In case of chronic form, hemorrhagic enteritis of the anterior intestines with congested liver and bile is diffuse in the abdominal cavity.

Prognosis:

The disease caused about 80% mortality in fish farming especially when the fish held under stress.

Diagnosis of the disease:

1. Case history.

2. Clinical signs.

3. Isolation and identification of the causative agent, Direct fluorescent antibody technique, indirect fluorescent antibody technique and enzyme-linked immunosorbent assay(ELIZA) are used for diagnosis of the disease.

Treatments:

1- Oxytetracycline 2 to 4 g /Kg of feed per day for 10 days..

2- Sulfamerazine at 264 mg/Kg given in food for 3 days, by 154 mg/Kg/fish/day for 11 additional days is effective treatment.

3- Prolonged bath treatments with potassium permanganate at 2 to 4 mg/L

Control

prophylactic bath treatments of 1 to 3% Nacl or 2 to 4 mg/L of potassium permanganate will reduce the incidence of post handling infections. avoidance stress factors

periodic drying, good hygiene and disinfection of ponds are important in prevention of disease.

Shipments of news eggs should be disinfected with acriflavine (500-700 ppm for 15 min) or Betadine (100-150 ppm active ingredient for 15 min) to prevent spreading of motile Aeromonas septicemia to hatcheries of fish.

Experimental vaccination for prophylaxis against infection .

Furunclosis:

Definition:

Furunculosis is an acute, subacute, chronic or latent disease, primarily among salmonid fishes characterized by formation furuncle or boil-like lesions in various tissues of the body.

Causative agent and Susceptible species:

The disease is caused by gram-negative, short bacilli called *Aeromonas salmonicida*, which is classified into two strains.

1. Typical *A. salmonicida, isolated* from salmonids only.
2. Atypical *A. salmonicida*, isolated from salmonids & non salmonids species**,** such as carp, catfish, and other fish species.Young fish are more susceptible to the disease than old fish.

Incubation period:

It is dependent on water temperature. Susceptible fishes at water temperature of 20C will develop furunculosis within 4 to 20 days .the signs of the disease may never develop among susceptible fishes at water temperature below 8 C.

Predisposing factors:

These include:

1. Physical damage of the skin or gills.
2. Poor water quality.

3. Presence of ectoparasites and other diseases.
4. Both smolting and high temperature.
5. High stock density.
6. Rough handling

Course of the disease:

1. Per-acute form: This form is restricted in young fish and leads to rapid death among fish.
2. Acute form: This form is characterized by sudden increase in mortality with few or no symptoms within 2-3 days.
3. Subacute form: This form characterised by gradual decrease in mortality. With furuncles formation and hemorrhages at the base of fins.
4. Chronic form: In this form mortality rate is low with intestinal inflammation and variable lesions.
5. Latent form: No mortality. But the pathogen present systemically.

Mode of transmission:

1. The infection was transmitted by ingestion of contaminated food.
2. Water was found to be vehicle for spreading the infection.
3. A carrier is important sources for the infection.
4. The infection occurs through eggs.
5. The infection may occur through injuries of the skin.

Clinical signs:

These are different forms showing on diseased fishes:

1. ***Per-acute form:*** This form is characterized by rapid death of fish especially young fish, whose defenses against a severe bacterial septicemia will be poor Darkening of skin, rapid breathing and slight exophthalmos may be observed on infected fish. Cardiac damage is a possible cause of death.

2. ***Acute form:*** Fish with an acute infection show signs of hemorrhagic septicemia, including body and vents. Skin lesions may be haemorrhagic patches along the side or on the dorsal body surface, hemorrhages at base of fins. Darkening of skin and sluggishness in movement. Hemorrhages scattered over abdominal walls, viscera and heart. Soft and friable or liquefied kidney is observed. Enlarged spleen with round edges. Pale liver with subcapsular haemorrhages. Stomach & intestine may contain bloody mucous. Swim bladder is hyperaemic. Raised furuncles, which usually develop in the result localization of bacteria in the dermis or occasionally the epidermis. These fruncules are raised dark, often on the back or sides of the fish which eventually ulcerate to release clear color blood – stained fluid into the water. Fish may die within 2-3 days.with Sharp increase in mortality rate.

3. ***Subacute and chronic form***: In this form mortality rate is low & more common in older fish. The clinical includes. Slight darkening of skin, inappetance, and lethargy and congested blood vessels at base of fins. Slight exophthalmos & fish may have pale or congested gills. The furuncle may be small and compact or large & soft. They contain dark red pus with numerous bacteria. The mature furuncle bursts leaving deep ulcer or healed furuncle may leave scar tissue. The furuncle may be found in liver, kidney and spleen.

4. ***Intestinal form***: This form is associated with low mortality. Prolapse of anus and intestinal inflammation may occur.

Diagnosis:

1. Case history.
2. Clinical signs and postmortem findings.
3. Isolation and identification of the causative agent.
4. Serological identification of the etiology

Treatment:

1. Sulfamerazine: 150-220 mg/kg fish weight/day for 10-14 days.
2. Oxytetracycline: 50-75 mg/kg fish weight/day for 10 days.
3. Furazolidone: 25-100 mg/kg fish weight/day for 10 days.

Control:

1- Use of antiseptic like acroflavin specially the eggs with 1:2000 in 20 minute.

2. Test and slaughter.
3. The pond is drained and bottom disinfected with quick lime.
4. All utensils used around the fishes and equipment must be disinfected.
5. Transportation of fishes from infected areas to other must be prevented.
6. Fish eggs should be obtained from fishes free from pathogen.
7. Movement of the water stream from infected area to non-infected must be prevented.
8. Immunization of fish against *A. Salmonicida* has been studied. Laboratory result indicated that fish can produce protective antibodies against the bacterium. (Formalin killed bacterial & mineral oil adjuvant).
9. Stress factors must be removed.

Fin Rot

This disease causes destroyed of the fins, the disease is also called Tail Rot because it affect the posterior region of fish body and cause erosion of peduncle fin. Fin Rot, is one of the most common and preventable bacterial fish diseases in aquarium and pond fish. Typically, this disease starts around the edges of the fin and gradually destroys more tissue until it reaches the base of the fin.

Causative Agent:

There are 3 theories for the cause of this disease:

1- *Pseudomonas* and *Aeromonas spp.*

2- The two bacterial type with other type of bacteria called *Myxobacteria*.

3- The disease may combined with other bacterial disease and a fungal species may be combined with it.

Epidemiology:

The disease is distributed in the pond by direct contact of infected fish to the normal or non infected fish and the water contamination can also play a role in distribution of the disease.

Clinical and Pathological Lesions:

White line appear in the lateral edge of the fins then the base of the fins which will appear like a cooked one in last stage of the disease and then lose of the affected completely.

Diagnosis:

By the clinical and pathological lesions and bacterial isolation.

Treatment:

Bathing of fish in 1:2000 cupper sulphate for 102 minute or adding of Ultramycine 10- 50 PPM to the water pond.

Bacterial /Environmental gills disease

Definition:

It's a chronic to acute disease, affect primarily cultured and aquaria fishes. Disease characterized by respiratory and osmoregulatory impairment.

Causative agent: Gills disease is caused by several agents:

1. Myxobacteria (*flavobacterium branchiophilum*) in combination with unfavorable environmental conditions. This type termed (bacterial gill disease).

2. Deficiency of pantothenic acid. This type is called nutritional gill disease.

3. Chemical pollution or pesticides with secondary mycotic infection (Haemorrhagic gills disease).

Stress factors:

1. Low oxygen content.

2. High turbidity of water.

3. High ammonia in water.

4. Change in pH of water.

5. Over stocking in fish farm.

6. Malnutrition of fish.

7. Mechanical injuries of the skin or gills.

8. Toxic inorganic and organic substances.

Susceptible species:

The disease has been found in most parts of the world where fish are cultured. Salmonids, carp, goldfish, catfish, eel and other fishes are susceptible to take the infection.

Mode of transmission:

Transmission of bacterial gill disease occurs from water to fish. Also the disease can be transmitted through injuries of gills.

Clinical signs:

1. Food intake by fish is reduced.

2. Sluggish movement of affected fish.

3. Fish remain near the water surface and often line up against the water inlet.

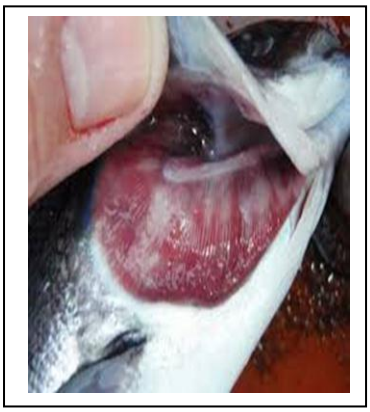
4. One of the most constant symptoms is the increased mucous secretion by the gills.

5. Gills may be swollen and congested, which results in their appearance deep red than normal.

6. In advanced cases gills lamellae are clubbed and filaments may be fused together because of hyperplasia of gill epithelium and depris protruding from beneath the operculum.

7. Signs of bacterial gill disease are white to gray spots on the gills. These spots are apparent when fish swims or turns in the water.

8. Haemorrhagic gills disease is characterized by the presence of sand-grains size aneurysms in the gill capillaries.



Diagnosis:

1. Case history.

2. Clinical signs.

3. Microscopic appearance of gills tissue hyperplasia, clubbing, fusing of the gills lamellae and the presence of myxobacteria are diagnostic.

4. Water chemistry to determine the source of gills irritants.

5. Isolation and identification of the causative agent of bacterial gill disease

Prognosis:

This depend on many factors. Morbidity rate is high and may reach 100% of a population under crowded condition. Mortality rate in an overcrowded fish population may be 25% to 30%. Morbidity and mortality rate from bacterial gills disease are usually more severe than environmental gill disease.

Treatment and control:

1. Treatment and control depend on etiology of the disease.

2. Stress factors must be removed.

3. Good management of the fish farm.

4. External disinfectants are used for treatment such as potassium permanganate 100mg/l for 30 second.

5. Chloramine-T: 6.5-8.5 mg/l for 1 hour.

6. Antibiotics used for treatment of bacterial gill disease.

Corynebacterial Kidney Disease

Corynbacterial kidney disease is one of the most dangerous disease which cause considerable losses in wild or cultured fish specially the salamon and American trout. This disease is also considered as a chronic disease which can happen in different water temperature and cause gradual increase in mortality rate.

Causative Agent:

Diploid bacilli non motile G^+ bacteria which classified as a species of corynbacteria and in the last classification is considered *Renibacterium salmoninarum*.

Epidemiology;

The disease transmitted by the egg and by parasite.

Clinical and Pathological Lesions:

Affected fish are usually darker in color with occasionally exophthalmia and small hemorrhages at the bases of pectoral fins. Small raised vesicles found the sides of the fish specially on the lateral line. At necropsy, lesions are usually found in the kidney, these lesions are whitish military of nodular granulomatus and may have a red hyperemic zone.

At low temperature the pathway was characterized by petechial hemorrhage on the parietal peritoneum of the abdominal wall and a diffuse white pseudodiphtheritic membrane over the abdominal viscera. Where as the temperature rise above 10C the membrane was absent from moribund fish and the main pathological features was focal necrosis of kidney, spleen and liver.

Histopathological Examination :

characteristic of the lesion in the kidney and other viscera is the proliferation of macrophages which are often replete with bacteria. A similar lesion is also found in muscle, in long standing cases there is often cessation of the center of the lesions.

Diagnosis:

Clinical and Pathological lesions with bacterial isolation.

Treatment:

1- Sulphadiazine 25 mg.100 kg of body weight for 7 days then 13 gm / 100 kg of body weight daily for 2 days.

2- Erythromycine 9 – 10 gm / 100 kg of body weight for 21 days.

Control:

1- Stock should be taken from sources free of the disease.

2- Preventation of the parasite infection.

3- Use of drugs and antisepting in the hatchers.

Mycobacteriosis of Fishes

Definition:

Fish mycobacteriosis is a chronic to subacute disease of many fishes. Caused by Mycobacterium sp. affecting freshwater, brackish water and saltwater fishes. Characterized. By emaciation, inflammation of the skin, exophthalmia, ulceration and grayish nodules in the internal organs.

Causative agent:

Many acid-fast bacteria have been recorded as the etiological causing mycobacteriosis, non motile, non-sporulated, G+ve and non-branching

Mycobacterium found in diseased fish can be divided into two groups, one showing a slow growth rate and another that can grow rapidly & requires less then 5 days for culture.

There are several species of mycobacterium known to cause of mycobacterial disease in fish. The most common species isolated form fish are:

1. *Mycobacterium marinum* isolated from marine fishes.
2. *Mycobacterium fortuitum* isolated from freshwater and brackish water fishes.
3. *Mycobacterium piscium* isolated from carp fish.

The optimum growth temperature is given as 25C to 35 C but they grow well at 18 C to 20 C. They usually will not grow at 37 C.

Predisposing factors:

Disease outbreaks in cultured fish appear to be related to management factors such as:

1. The quality & quantity of nutrient and water supplied.
2. High stocking density.
3. Poor management of fish farm.

Susceptible species:

Mycobacteriosis are worldwide distribution in fish population. both freshwater and saltwater fishes have been reported as hosts for this disease. Mycobacteriosis occure in aquarium fish.

Incubation period:

The incubation period varies greatly and depends on susceptibility of fishes, temperature and severity of exposure and routs of infection. It may take a few weeks or month to years.

Mode of transmission:

1. Fish may be infected by ingesting feed & water contaminated with faecal material, urine or exudates from diseased animals that contain mycobacteria.
2. The infection may occur through the skin & gills lesions caused by injure or parasitic infection.
3. Trans-ovarian transmission may be occur.
4. Carriers may play an important role in spreading of the infection (eg. snails and arthropods).

Clinical signs:

The external gross signs of mycobacteriosis may vary, depending on the species of fish affected & water temperature. The clinical signs includes:

1. Emaciation with reducing of growth rate.
2. Loss of appetite of fish.
3. Ascites.
4. Shallow grayish irregular ulceration on body surface.
5. Deformities of the vertebral column and mandible.
6. Fish become listless and show difficulties in maintaining balance.

7. Exophthalmia and loss of one or both eyes may be appeared on infected fish.

8. Disease leads to loss of colouration in ornamental fish.

9. Loss of scales may be observed on the scales fishes.

10. Gills are paler than normal and show thickened areas on some filaments.

11. The internal sings are more characteristic they consists of the presence of small grayish tubercles or nodules in the liver ,spleen & kidney. These nodules are typical granuloma. They filled with large masses of mycobacteria.

Diagnosis:

1. Case history.

2. Clinical signs & P.M.

3. Direct smear from internal organs and stained with Ziehl Neelsen stain.

4. Isolation and identification of M.OS using a number of criteria, including acid-fastness, growth rate, pigment production, colonial morphology & biochemical reactions.

5. Enzyme-linked immunosorbent assays (ELISA) have been developed for detecting mycobacterial antigens.

Treatment and control:

There is no suitable treatment of infected fish, as *Mycobacterium spp*. are mostly resistant to conventional antibiotics. Adding tetracycline to the water at dose 30 mg/l help in treatment of fish. Chloramine B or T at a concentration of 10 mg/l for 24h is recommended for bath treatment.

Kanamycin mixed with food was effective in treatment of disease among ornamental fishes. The recommended dosage is 0.01% from food.

Control of disease based on:

1. Stress factors must be removed.
2. Dead fish must be removed & disposed.
3. Dead fish carcasses that will be used as a source of protein in the feed should be treated at 76C for 30 minutes.
4. Suspected or infected fishes should never be introduced in to a pond or aquarium.
5. Quarantine is important in the ornamental fishes (2 months).
6. Treatment of the parasites to prevent spreading of the infection.
7. Formalin or phenolic compounds should be used as disinfections in fish farm at which the disease have been recorded.
8. Fish egg must be free from *Mycobacteria spp.*
9. Contaminated food and utensils should not be used.

Vibriosis

Definition:

Vibriosis is one of the most prevalent fish diseases caused by bacteria belonging the genus *Vibrio* affecting many marine and fresh water fishes. The disease characterized

by septicemia, dermal ulceration, ascitis and haematopiotic necrosis.

Causative agent:

The most important etiological agent of vibriosis is *V. anguillarum*, is Gram negative, rod-shaped bacterium either curved or straight, motile, non-sporulating and non-capsulated. The organism does not produce pigment. It grows rapidly at 25-30C in rich media such as brain-heart or trypticase soy broth containing 1.5% Nacl. *Vibrio spp*. is able to survive in sea water more than 50 months. On solid medium, it produces circular, cream-coloured colonies.

Stress factors:

1. High water temperature.
2. Over crowding in fish farm.
3. Organic pollution of the water.
4. Poor nutrition.
5. Poor water quality.
6. Improper handling.

Susceptible species:

Most are marine & estuarine fishes (salmonids, mackeral, herring...etc.). Fresh water fishes are also susceptible to vibriosis include, rainbow trout, carp, eel and tilapia.

Mode of transmission:

1. The infection may be transmitted through oral route.
2. External injures and external parasites may play a role in transmission of infection through the dermal route.
3. The organism found in gut and under any stress condition, it might invade the host.
4. Carriers may be playing a role in spreading of the infection.

5. Feeding of the fishes from contaminated food (infected fishes or viscera of died fishes).

6. Contact between diseased fish & healthy one.

Incubation period:

Incubation period may be short (3 days). This depends on virulence of the pathogen and susceptibility of the fishes.

Clinical signs:

1. The course of the infection is rapid and most of the infected fish die without showing any clinical signs.

2. Anorexia, darkening of the skin and sudden death in young fish.

3. There is abdominal distension, anemia and dermal hemorrhages.

4. Red spots found on the ventral and lateral areas of infected fishes.

5. Congestion and swelling of the spleen, liver and kidney.

6. There is intestinal hyperemia together with clear viscous fluid within the intestinal tract.

7. There may be boil like lesions found under the skin and in muscles not much different from furuncle. For this, the disease called saltwater furunculosis in salmonids.

8. These furuncles break to the exterior and necrotic skin lifted away, leaving large open ulcer.

9. Eye lesions are common including corneal edema, ulceration and exophthalmos.

10. Fin rots and paleness of gills may be show in chronic infection.

Diagnosis:

1. Case history.
2. Clinical signs and P.M.
3. Isolation and identification of *Vibrio spp*.
4. ELISA and immunofluorescens tests help in diagnosis of the disease.

Prognosis:

Mortality rate among susceptible fishes may reach 80% and morbidity rate may reach 100%.

Treatment and control:

1. Sulphamerazine: 12gm/100lb of fish/day for three days followed by 7 gm/100lb of fish/day for 11 days.
2. Oxytetracycline: 3-5gm/100lb of fish/day for 10 days.
3. Furazolidone in feed: 100mg/kg/fish/6days.
4. Stress factors must be avoided.
5. Good management of fish farm.
6. Disinfection of the fish egg may help in prevention of the infection.
7. Feeding of died fish or viscera of infected fish as sources of protein to healthy one should be avoided.
8. Fishes from infected farm should be not move to non-infected areas.
9. Disinfection of all containers and equipment to prevent spread of the infection.
10. Formalin-killed vaccine or bacterial membrane components give the best protection when administered by intraperitoneal injection rather than immersion or oral administration.
11. Quarantine of new fish and good sanitation will minimize the spread of infection.

Nocardial Diseases:

This chronic disease occur in many species of fish in fresh water and distributed in many area. The disease are describe in tropical fish as a lethal granulomatous disease of the skin, muscle, and various inner tissues of affecting fish.

Causative Agent:

Nocardia asteroides G^+ non – motile aerobic bacteria which frequently branch, Nocardia obligatory aerobic and they are acid fast bacteria.

Transmission and Epidemiology:

This disease is distributed in western east and Spain. The young fish(fry and juvenile) is more sensitive to the disease, and the disease occur in summer and early autumn.It transmitted through horizontal transmission from sick fish or consuming uncooked fish tissues.

The infection develops silently as the bacteria multiply slowly over months within major organs, such as the spleen, kidney and liver

Clinical Signs :

The affected fish appear thin with large belly and enlargement of the mouth, change in skin color specially in early stage

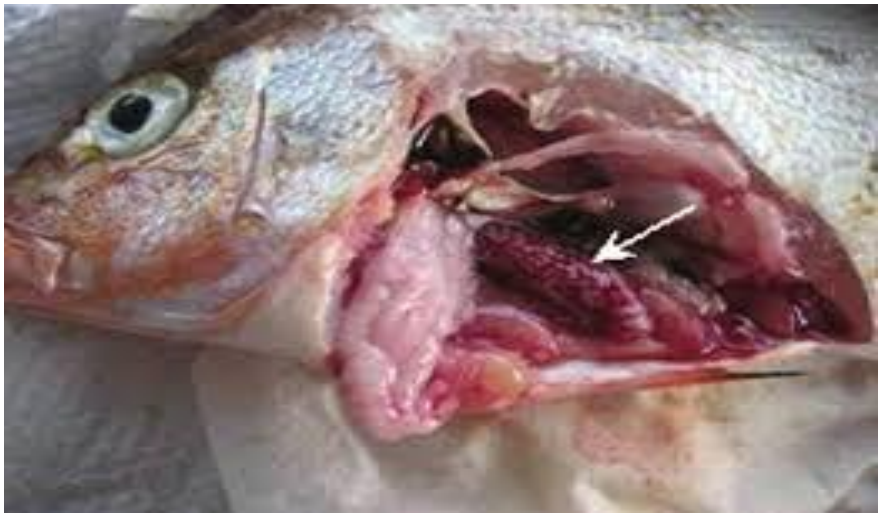
Pathological Lesions

The most pathological lesions is the cassation (white-yellow granulomata are usually 1-2 mm in size. The spots are most obvious in the muscular , spleen, kidney and liver, swim bladder .

The typical external lesions are: skin nodules (focal, multifocal or coalescing), skin ulceration

opercular erosion and irregularly-shaped fleshy white masses at the base of the gill filaments.

The internal pathology of nocardiosis is easily confused with other white-spot-forming diseases, such as mycobacteriosis (fish tuberculosis) and photobacteriosis (formerly Pasteurella or pseudo-tuberculosis), especially if mixed infections exist.



Treatment and Control:

The disease is a chronic one so the antibiotics is of no value in treatment. The best way for control is the presentation.

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Columnaris Disease

Colmnaris is considered as a wide distribution diseases of fresh – water fish. The disease is also called Cotton Wool Diseases,it may be acute or chronic disease according to water temperature and bacterial virulent

Causative Agent

Flexobacter columnaris G- negative aerobic bacilli.

Epidemiology

Disease outbreak usually occur at temperature is excess of 18C but highly virulent strains may require less duration in temperature rises to produce sever infection. The incubation period is very short 1-2 days and the infection transmitted by direct contact between the infected and the normal fish. So the overcrowding and rose of temperature to 20C play a role in the infection.

Clinical and Pathological Lesions

Lesion are usually confined to the skin of the head and back and the gills although other parts of the body may also be involved. They begin as raised whitish plaques with a reddish zone of hyperemia around the periphery.

On the gills the lesions are often more necrotic and death more rapid.

On the skin they soon develop into hemorrhagic ulcer with an overlying with necrotic tissue containing bactrial. The lesions may be yellow or organ due to the pigmentation of the individual bacterial cells.

Treatment

1- Potassium Permanganate 1:50000 for 10 – 15 minute.

2- Cupper Sulfate 1: 30000 for 20 minute.

3- Oxytetracylcine 8-10 gm/100 kg of body weight for 10 days.

Peduncle Disease (Cold Water Disease)

This disease affected the salamon fish family and occur only when the water temperature reach less than 10 C. The mortality rate may reach 50% in the small fish.

Causative Agent

Flexibacter psychrophila G^- bacilli.

Clinical and Pathological Lesions

The adipose fin is the first organ which affected it become white in color then it completely destroyed, the tail fin is also affected and the vertebra become completely without flesh. The disease may extend to internal organs in last stage of the disease.

Diagnosis

Isolation of the causative agent, and the decrease in temperature of the water.

Treatment

Use of sulphonamides with food 22 mg / 100 kg of body weight for 10 days with increase the water temperature.

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Streptococcal Disease

Causative Agent

Streptococcus faecalis

Epidemiology

Streptococcus faecalis normally found in fish fecal material. The outbreak are not common and it is likely they result from human contamination of hands at stripping of the water supply.

Clinical and Pathological Lesions

Losses of fish which appear normally at necropsy the fish are septicemic with peritonitis and enteritis and accumulation of mucus fluid red in color in the abdominal cavity with dark and enlargement of the liver.

Diagnosis

Clinical and Pathological lesions with isolation of the bacteria.

Treatment

Use of antibiotics as

Oxytetracycline 50mg/L

Erythromycine 25mg/kg body weight for 4-7 days.

Bacterial Enteritis of Grass and Black Carp:

It is a wide distribution disease of 1-2 years old fish, its mortality may reach 90%.

Causative Agent:

G^- bacilli which called *Pseudomonas fluorescence intestinalis*.

Clinical and Pathological Lesions

Swelling and hemorrhage on anus

Release clotted blood mixed with yellowish mucoid material from anus when press on abdomen

Loss of appetites, the swim bladder is dark to black in color and accumulation of fluid in the abdominal cavity, hemorrhagic enteritis.

Diagnosis:

The pathological lesions and bacterial isolation.

Treatment

Sulfaquindain 1gm / 10 kg food in the first day then 0.5mg / 10 kg food for 10 day later.

Red Spot Disease of Grass and Black Carp

Some time may called Hemorrhagic Septicemia because of septicemia signs of the disease. The disease is called also Ulcerative Disease due to the skin ulceration on body.

Causative Agent

Pseudomonas fluorescens migola

Clinical and Pathological Lesions

The hemorrhagic form characterized by erosion and sloughing of the scales specially on the belly region, hemorrhagic spots on the fins and around the mouth. The ulcerative form characterized by skin inflammation and muscular tissue (Liquefactive necrosis) and abscess which contain pus then open and cause ulcers. The fish loss its appetite and their weight.

Treatment

Chlorid powder 5 – 10 mg / liter for 30 minute.

White Skin Disease of Sliver and Big Head Carp

Causes

Pseudomonas dermoalba G^- diploid bacilli. This disease cause mortality after 2-3 days of the infection or the appearance of the symptoms.

Clinical and Pathological Lesions

The white fish color of skin began from the region between the dorsal and the tail then between the dorsal and anal fin and the fish left its tail at in swim.

Diagnosis:

Isolation of the causative organism.

Treatment:

1- mercuric acetate 2mg / liter for 2-5 hour.

2- Euromycine 12 – 5 mg / liter for 1/2 hour.

3- Chloride 1mg / liter.