

PASTEURELLOSIS (PSEUDOTUBERCULOSIS , PHOTOBACTERIOSIS)

The disease agents are *Photobacterium damsalae subs. piscidida* , *P . damsalae subs. damsalae* , and is a common and fatal disease worldwide. The disease is acute and chronic forms that is observed small hemorrhages on operculum, and base of fins, abnormal skin color, enlarged liver, spleen and kidney in the fishes. The disease is severe when the water temperature is rise to 25° C and the mortality rate is increase , and its rate increases in summer.

The fish take the agent orally with food or water, and the bacterium enter portantres. Mode of transmission is known fish –to-fish contact and invertebrate vectors have both seen suggested. Epidemics do not develop if the temperature remains below 25 ° C. The high temperature has also been associated with outbreaks in the fish farms.

Pathology and clinical signs :

In the acute form, few clinical signs are present. Swimming is disturbed in fishes, and death of fishes increases in a short time. The enlargement and the apperance of blackberry of the spleen are typical necropsy findings. Hemorrhagic fluid accumulates in the abdominal cavity, pale of kidney, and multifocal necrotic areas the surface of liver are observed some necropsy findings in the fishes.

In the chronic form , there are 1-2 mm in diameter military lesions in the kidney and spleen that are composed of bacteria. These lesions are resemble the tuberculs of tuberculosis. The apperance of this latter lesions, grossly resembling mycobacteriosis (or tuberculosis) , has led to its being misdiagnosing called Pseudotuberculosis.

Diagnosis :

Presumptive diagnosis of disease is based on presence of typical gross lesions. The agents can be isolated from affected organs, especially spleen and kidney.

Control and treatment :

Vitamins and mineral substances are added the food. Vaccination is one the most effective method againts the disease. Treatment should be started before the disease become chronic form.

Oxytetracycline 40 mg /kg X days , chloromphenicole 50-70 mg / kg X 10 days, sulphadiazine 200 mg / kg X 10 days, sulphamerazine 200-400 mg / kg X 7 days, trimethoprime 50 mg / kg X 10 days.

EDWARSIELLA SEPTICEMIA

The disease progresses from mild to severe, and it is an infectious disease that cause small skin lesions and abcess on the skin, discoloration of the skin.

The disease is caused by species *Edwarsiella torda* and *E. ictaluri* found in genus of Edwarsiella.

Enteric septicemia is one of the most important disease that affected fish, causing high level economic loss in the fish farms. In the fishes, the septicemia is a markedly seasonal disease, with outbreaks occurring when water temperatures over around 24-28 ° C during May and June , as well as september and October in fish farms. The bacterium can survive for over 90 days in pond mud a 25 ° C , which may account for recurrent epidemics in ponds. And , the bacterium can probably be carried in the gut of asymptomatic fishes. The mortality rate may be reached 50 % in the infected fishes. The agents suppresses the immun system in infected fishes.

Pathology and clinical signs :

Two forms of the disease are related to the route of exposure have been described in the fishes.

1) acute (septicemic) form : In the gut route , bacterium are ingested, enter bloodstream through the intestine, and apparently colonized various organs, causing necrose and ulceration. There is typically mortality and in some cases few external signs.

Clinical affected fishes may occasionally hang head up in the water and exhibited crooked spinal swimming, usually followed by death. Fish may have abdominal distension, exophthalmus, or pale gills. The bacteria localizing in the dermis causes necrosis and hemorrhage that result in red-petechiae on the dorsum, flanks, jaw, and operculum. Petechiae on dark areas of the skin appear as small, depigmented foci.

Internally, the peritoneal cavity contains blood or clear water (which is especially characteristic), hemorrhage and necrosis of the liver, and splenic and renal hypertrophy. There are petechial hemorrhages in the muscle.

2) Chronic form : In the nervous route, bacteria invade the olfactory organ via the nasal opening and migrate up to the olfactory nerve to the brain, where the infection spreads from the meninges to the skulls and finally to the skin, forming the hole in the head lesion. This is a raised or open ulcer on the frontal bone of the skull. Disease progression is more chronic than via the gut route. In fishes, enteritis and hepatitis are observed . Myositis, and interstitial nephritis , begins as acute lesions and develop into chronic and then chronic signs.

Diagnosis :

Clinical and necropsy findings are not sufficient for diagnosis, therefore laboratory diagnosis is required.

Control and treatment :

General protection principles must be followed. Vitamin C supplement reduce mortality rate up to 20 % .60 gr Vit. C is added to 1 kg of food. Oxytetracycline 55 mg / kg X 10 days in food.

ENTERIC RED MOUTH DISEASE / ERMD / (YERSINIA RUCKERI INFECTION)

Yersinia ruckeri is an important pathogen in salmonids. Rainbow trout is especially susceptible. The disease has high morbidity and mortality rates that has acute and chronic forms, is characterized by hemorrhagic septicemia , especially dark coloration, exophthalmus, hemorrhage in mouth and eyes,

depression, and swollen abdomen. The incubation period is 5-10 days at 13-15 ° C. The bacterium live 2-3 weeks in water, but they may live 2 months in mud.

The acute form is observed in juvenile and young fish in the spring when the temperature rises, and the disease is chronic in older fish in the autumn when the temperature decreases.

The disease causes significant economic loss during the offspring period. The water fowls can take the bacteria to different regions, so the disease can spread over a wide area.

The mortality rate is 10-60 %, and the morbidity rate is 100 % and also. In natural conditions, fish deaths begin between 5-19 days and may continue for 1-2 months. The mortality rate increases 60 % in case of severe septicemia.

The fish are infected by oral route taking the bacterium or penetrates on the skin that pass into the water with the faeces of sick fish. The bacterium can be found up to 3 months in fish, and can pass into water, and the surviving fish remain.

Pathology and clinical signs :

The acute form of the disease develops rapidly, and the symptoms are not observed or very little symptoms in the diseased fish. There is motility increase and lack of appetite in fish. The erythema is observed oral region, fins base and anal region, and affected fish are dark, anorexia and lethargic, and swimming close to the water surface. In infected fish, petechial hemorrhagic foci and erythemas are observed the gonads, periton and mesenterium.

Digestive organs are erythema, and full with hemorrhagic mucoid fluid. In affected fish, the spleen and liver are enlarged, and the muscles are hemorrhagic. Although subacute form resembles acute form, it progresses severely more than acute form. The pathogenic destruction in the skin and fins are evidently, the organs such as liver, spleen and kidney are more enlarged, exophthalmus is observed in one or both eyes.

With chronic disease, there is also abdominal distension, unilateral or bilateral exophthalmus, and blood spot. In this case, darkening is due to ophthalmic lesions, which cause blindness, leading to lack of melanin pigmentation control. Fish also accumulated and near the outlet screens of the raceways.

Diagnosis :

Definitive diagnosis of the disease requires identification of the bacterium in the target organs, with attendant clinical signs. Kidney is the best organ for isolation during epidemics.

Control and treatment :

Eggs from infected broodstock should be treated with antiseptics. The substance with active iodine can be used. The vitamins and mineral substances are added to the food. Vaccination is one of the effective practical methods against the disease. Vaccination provides protection for up to 12 months.

Sulphamerazine 200 mg / kg X 10 days , oxytetracycline 50-75 mg / kg X 10 days , chloramphenicol 50-75 mg / kg X 10 days , ormetoprim 50 mg / kg X 5 days, oxolinic acid 10 mg / kg X 10 days , sulphadiazine and trimethoprim 1 mg / kg X 14 days.

BOTULISM (CLOSTRIDIUM BOTULINUM)

Botulism is a sporadic and toxic disease that is characterized with paralysis , incoordinated swimming , balance disorder, and disease caused by *Clostridium botulinum*. The spores of *C. Botulinum* are very common, and they have been found in the gills and viscera of fish. The bacteria is abundant in the mud at the bottom of the ponds and in an oxygen free environment. The fish become infected to ingestion of bacteria or spores, in addition to by consuming food contaminated with spores.

No obvious signs of disease. Depression, anorexia, reluctant swimming (such as swimming in the top of bottom of the water) and paralysis are found in affected fishs.

The diagnosis of the disease is difficult, toxin detection is required in tissue, and there is no known treatment. There should be no mud and sediment at the bottom of the ponds. The ponds are disinfected after bottom cleaning.

MYCOBACTERIOSIS (FISH TUBERCULOSIS)

Mycobacteriosis is probably the most common chronic disease that affects aquarium fishs, in addition to all freshwater and marine fishs are probably susceptible, it has also recently become a serious problem in several species of cultured food fish.

Most of the bacterium isolated from fishs are *Mycobacterium marinum*.

Affected fishs are exhibited shallow to deep skin ulcers, corneal ulcers, pale coloration, emaciation, white nodules on viscera.

The bacteria can survive for 1 year in water and for 2 years in fishs. Shedding of bacteria from infected skin ulcers, as well as the intestine, is probably a major source of contagion. Ingestion is probably the major source of infection. Transovarian transmission has been demonstrated in fishs. And, the contamination most occurs through the skin after injury and trauma. The bacteria pass into water from the lesions on the skin. The risk of disease is high in ponds with excessive fish density. The gills are probably contamination route.

Mycobacteriosis is a zoonotic disease. Some species can infected humans.

Pathology and clinical signs :

The disease is acute and chronic forms in fishs. Acute form is rarely occurred, and fish die within 2 weeks. The incubation period is long in chronic form. The disease remains asymptomatic for a long time, and the incubation period may take 3-9 months. The clinical signs in fish are progressive weight loss, anorexia, depression, difficulty breathing, discoloration , ulcers of skin and fins, unilateral or

bilateral exophthalmus , spinal and mandibular deformation. But, not all these signs are found in one fish at the same time.

Internally , 1-4 mm diameter white nodules may be present on the viscera, especially hypertrophic kidney and spleen.

Diagnosis :

The diagnosis of the disease is difficult with the clinical and necropsy findings.

Control and treatment :

Many infections involving up to several *Mycobacterium* species have been observed in some cases, and the relative importance of each species to the clinical signs and disease is usually not entirely clear.

The common presence of environmental mycobacteria in soil and water , as well as their resistance in asymptomatic fish for long periods suggest that the total elimination of exposure risk might be impossible and that keeping chronic stress low is essential for management.

As with so many diseases of fish , mycobacteriosis usually gains a foothold under suboptimal environmental conditions. Once established, it can be difficult to control. The apparently high prevalence of subclinical disease in fish also makes it difficult to exclude.

Many drugs have been advocated for treating this disease, but eradication of infection remains unproven. Kanamycin may be effective in reducing clinical signs in some cases, but treatment of infection remains incomplete.

In fact, treatment of disease is expensive and requires a long time , for this reason diseased fish will be destroyed.

Recombinant and DNA vaccines are used for protection in fish farms. DNA vaccine provide to protection for 3 months.

GENERAL PROTECTION PRINCIPLES

The prevention is always a cheaper, easier and effective method than treatment in fish farms. It should be ensured that there are no favorable factors for the emergence of disease as priority in farms.

- 1) the fish stock in ponds is balanced
- 2) no stress factors for fish
- 3) the management and feeding must be good, sufficient and high quality
- 4) there should be no sick or dead fish in the ponds
- 5) the fish are supplemented with vitamins and mineral substances in feed
- 6) water temperature should be optimum level

7) the farm ' s infrastructure, ponds, hatcheries, and all material used should be disinfected at regular intervals

8) biotic (for bacteria, virus, alg, parasites, fungus) and abiotic (physical and chemical conditions) control of the water coming to regularly

9) fish, egg and fry without certification should not be purchased

10) detection of the disease in short time prevents outbreaks

11) the vaccines against the disease should be used if available