
Branchiomycosis

Gill Rot, European Gill Rot

Definition "acute, subacute and chronic mycotic disease affecting freshwater and brackish water, specially cultured and aquarium fishes, and characterizing by gill degenerative changes (marbling appearance), gill necrosis (gill rot) and high morbidity (100%) & mortality (30-50%) among affected fishes ".

Two members of Branchiomyces species are incriminated in disease occurrence they are:

Etiology **B. sanguinis and B. demigrans**
Both species need high oxygen tention for their growth.
B. sanguinis: has thin hyphal wall (0.2 μ) that contains small spores (5-9 μ) in diameter. They usually locate within **branchial blood vessels** and discharge their spores into the **blood stream**.
B. demigrans: has thick hyphal wall (0.5-0.7 μ) that contains large spores (0.7-0.12 μ) in diameter. They usually locate within **branchial tissue** and discharge their spores directly into the **water stream**

These fungi have long branched aseptated hyphae, reproduce primarily asexually. They can grow between 14-35° C with optimal growth temperature of 25-32° C. They grow well on Sabauraud's dextrose agar (with or without blood supplement), blood broth and blood agar at 20-27° C.

Susceptibility All freshwater and aquarium fishes in particular cultured ones that depends on high amount of organic fertilizers are susceptible to catch the disease.

Predisposing Causes (stressors)

- Overcrowding and physical trauma.
- Low dissolved oxygen.
- Presence of large amount of organic matter and water blooms.
- Nutritional deficiencies and malnutrition especially among cultured fishes.
- Injuries of the gills either by trauma or ectoparasites.
- High temperature variation (25~32° C) specially at late summer.

- Sub-lethal level of toxic substances in the water (pollution).

**Mode
of infection
&
Transmission**

Directly: through penetration of the fungal elements (spores, hyphae and / or both) the gill epithelium and locate into the branchial blood vessels or tissue according to the fungus species.

Indirectly: through ingestion of the spores that undergo the blood stream through the intestinal lymphatic circulation and reach the gill as their final target (where as oxygen tension is high) and germinate at the gill blood vessels or gills tissue according to the fungus species.

**Source
of infection**

Contaminated water with the fungal elements consider as the main source of infection. Dead and dying fishes. Carriers particularly, chronic infected fishes.

Pathogenesis

Presences of the fungal elements (spores and / or hyphae) in the blood vessels of the gills reduce its blood supply leading to formation of thrombi and frequently infarctions occur. As a consequence many gill lamellae undergo different degrees of necrosis. Marbling appearance of the gills is a characteristic for the disease. Fatal termination is the final result due to impaired respiration.

Although the fungal elements may reach the visceral organs via blood circulation, they doesn't chare in the epizootological finding because those organs have low oxygen tensions so the fungus fail to induce any lesions.

**Disease
signs**

Acute form:

This form is characterized by rapid onset with rapid fatal termination:

- The fish lose their appetite and gathered in groups near the water inlet and water surface then going to die.
- Fish can't tolerate handling.
- Gills of died fish are severely congested and appear bright red or deep brownish red.



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Subacute form:

- Marbling appearance on different areas of the gills.
- Gills become ischemic, ragged and corroded.
- Sloughing of some gill lamellae.

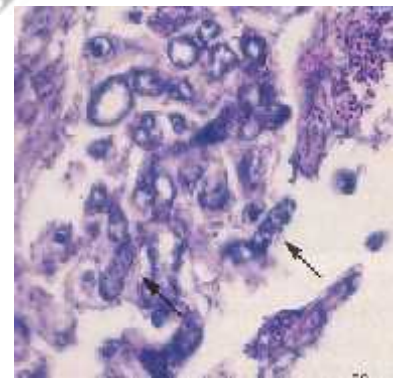
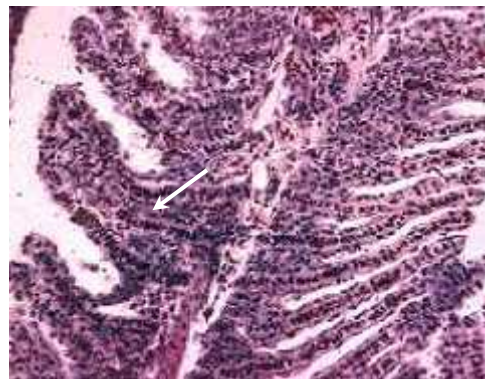
Chronic form:

- Pale areas and / or muddy grayish strips on the gill.
- Swollen gill lamellae together with thrombi into gill epithelium.
- Slight to moderate necrosis of the gill lamellae



Postmortem Findings

- In acute cases the gills appear bright red to brownish in color, while in sub-acute and chronic cases different alternations with the gill appearance are present ranged from ischemic areas, marbling areas, several degrees of necrosis.



Microscopic Pathology

- Hyperplastic proliferation and \ or destruction of the epithelial linings accompanied with fusion and edema of the gill Lamellae.
- Degenerative, necrotic changes, and thrombi formation within the gill tissues accompanied with fungal elements (spore and/or mycelia) deeply into the gill tissues.

Diagnosis

I. Case history revealed that:

- Loss of appetite or may the fishes refuse food.
- Sluggish swimming and the fish together with respiratory distress.
- Presence of mortalities.

II. The disease signs (as mentioned above).

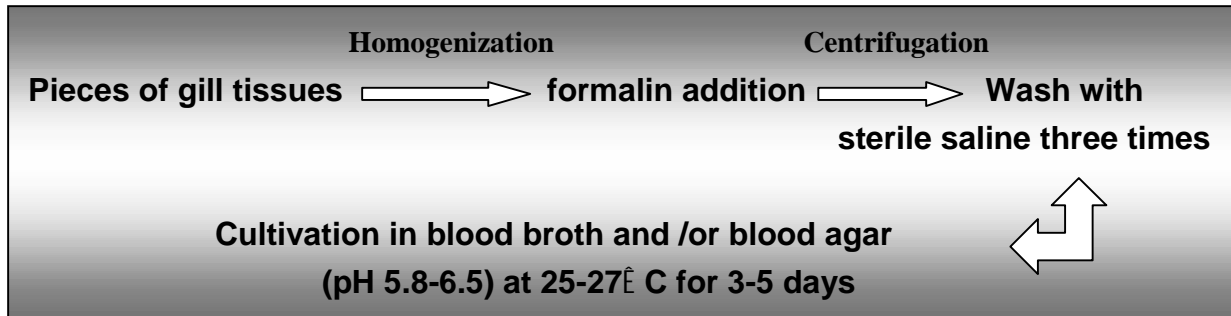
III. P. M. findings.

IV. Laboratory diagnosis:

- Samples: gills tissue from dead and dying fishes.
- Direct examination of gills tissue under microscope using

compressed slide to detect the presence of fungal elements (spores and / or hyphae).

Isolation and identification:



Sabauraud's dextrose agar with and /or without blood supplements.

- Histopathological findings: As aforementioned.

Therapy & Control

Chemotherapy:

Up to date there is no therapy, for the reason, preventive hygienic measures are recommended to control the disease.

Control

Good hygiene and removal of all stressors is the proper way for disease control this can be achieved through:

- Avoid overcrowding.
- Proper disposal of dead and dying fishes either by burning or burying.
- Control of aquatic animals such as reptiles and amphibians.
- Proper disposal of infected fish if in small number.
- Proper drainage, drying, and disinfectant of the pond (Perfect disinfections using quick lime 1.5 ~ 4.0 tons / acre)
- Quarantine and restriction of the fishes from infected areas.
- Increase the water flow and aeration (if possible).
- Improve all hygienic measures