

Phoma herbarum

I. Causative Agent

Phoma herbarum causes a systemic mycotic infection in salmonids and is normally a pathogen of plants. This fungus is a member of the fungi imperfecti with unknown sexual reproductive stages in the order Pleosporales. The fungus infection is characterized by mycelial invasion of the air bladder and/or digestive tract. The fungus invades other organs becoming systemic resulting in gut obstruction and peritonitis.

II. Host Species

The disease has been found in cultured fry and fingerling coho, Chinook and sockeye salmon, lake trout, steelhead/rainbow trout and Arctic grayling in Alaska and the Pacific Northwest.

III. Clinical Signs

Affected fish may swim on one side or in a vertical position with tail down or may rest on one side at the bottom of the rearing container. Fish often have swollen and hemorrhagic vents and the abdominal area can be laterally compressed into a "pinched abdomen". Fish may also exhibit hemorrhage of the caudal fin and/or petechial hemorrhages on the lateral and ventral body surfaces, fluid-filled air bladder, visceral necrosis and adhesions with severe hemorrhaging, perforated body wall and secondary *Pseudomonas* septicemia.

IV. Transmission

Phoma herbarum is a weakly infectious facultative fish pathogen that likely invades either by entrance of conidia or hyphae into the air bladder via the pneumatic duct connecting the esophagus, or by entering with food into the lower gastrointestinal tract where the primary focus of infection may develop. There-

fore, transmission of infectious stages is suspected to be oral with food or with gulping air to inflate the air bladder.

V. Diagnosis

Diagnosis is based on typical gross clinical signs and septate fungal hyphae present in the lumen of the air bladder or gut and/or the presence of visceral hyphae. The fungus is cultured by aseptically removing material from the abdominal cavity of an infected fish and plating onto sabouraud dextrose or potato agar and incubating at 16-20°C. Colonies appear as light buff turning to light pink and finally to greenish-gray to black as pycnidia are formed. Pycnidia produce hyaline unicellular conidia. Hyphae are fine in diameter and septate (have cross walls).

VI. Prognosis for Host

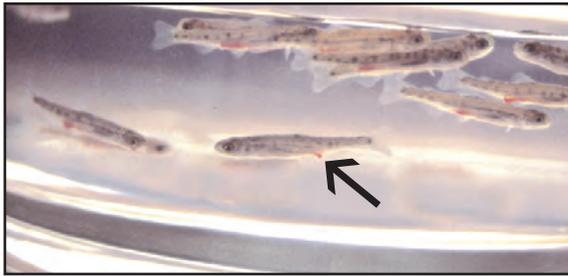
There is no known treatment for systemic mycosis in fish. In most cases only a small percentage of the population will become infected. Those fish that are infected will eventually die. In natural infections, cumulative mortality is generally low (<2-5%) but can be up to 20%.

VII. Human Health Significance

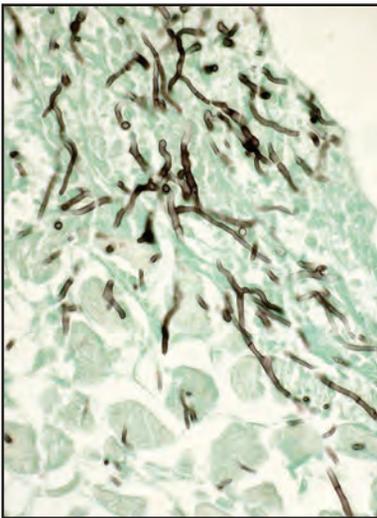
There are no human health concerns associated with *Phoma*.



Perforated body wall near vent and "pinched abdomens" in fry with *Phoma* infection.



Anal prolapse (arrow) and hemorrhage of sockeye salmon fry infected with *Phoma*.



Left: Hyphae of *Phoma* (black) invading fish muscle, Grocott's fungus stain, X 200;
Right: *Phoma* hyphae exhibiting typical septa or crosswalls, X 1000.

