

Black Mat Syndrome

I. Causative Agent and Disease

Trichomaris invadens, the causative agent of Black Mat Syndrome, is a chitinoclastic, obligate Ascomycete fungal parasite of Tanner crabs. The fungus proliferates on the surface of the exoskeleton invading the shell and internal soft tissues causing destruction with little or no host response. Infected crabs have varying degrees of a dense black tarry encrustation on the surfaces of the carapace and appendages.

II. Host Species

In the 1970's and early 1980's, the fungus was prevalent in the Alaskan Tanner crab fishery around Kodiak Island and in the northwestern Gulf of Alaska, primarily infecting *Chionoecetes bairdi* at prevalences as high as 75%. The fungus rarely has been found infecting *C. opilio* and *C. tanneri* but has also been reported in *C. bairdi* from deep fiords in northern British Columbia, Canada.

III. Clinical Signs

Infected crabs have varying degrees of encrusting nodules or pustules forming a dense, hard, black, tar-like covering over parts of the exoskeleton. Histological examination of internal soft tissues shows dense proliferation of non-pigmented fungal hyphae and tissue necrosis. There is a significant increase in the percentage of eosinophilic granulocytes in circulating hemolymph of infected crabs while infected female crabs may be barren.

IV. Transmission

The mode of transmission is unknown but is likely horizontal via infectious ascospores in ambient seawater or

by direct contact with infected crabs.

V. Diagnosis

Varying degrees of a black encrusting fungal mat on the exoskeleton of Tanner crabs is confirmed as *Trichomaris invadens* by wet mounts or histological examination showing the external thick-walled, black pigmented, infrequently septated hyphae with fruiting bodies or perithecia containing many asci each of which contains eight ascospores. Each ascospore has a long thin filament tightly wound around each end that unwinds when the spore is discharged. Internal tissues are invaded by dense proliferations of non-pigmented hyphae also having infrequent septa. Internal fungal hyphae are positive (black) when stained by Grocott's methenamine-silver method for fungi. The fungus has not been cultured successfully on artificial media.

VI. Prognosis for Host

Moderate fungal infection likely prevents molting and causes blindness if eyestalks are invaded. Severe infections likely result in crab mortality, however, the pathogenesis of the disease has not been studied in the laboratory. Black mat appears to occur more frequently in old shell or skip molted crabs. Infected sublegal-sized animals that fail to molt will not reach legal size and immature females will not reach sexual maturity.

VII. Human Health Significance

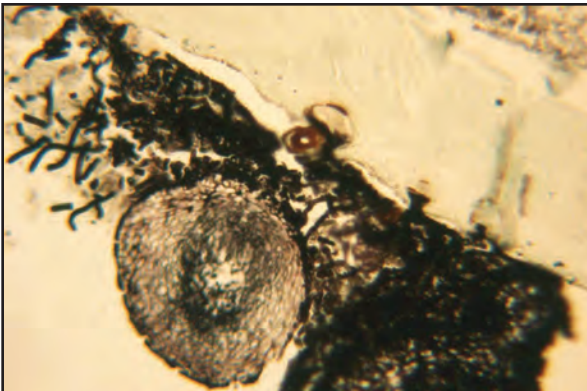
There are no known zoonotic human health concerns regarding consumption of Tanner crab meat infected with *Trichomaris invadens*.



Black mat fungus (arrow) infecting the underside of the carapace of a Tanner crab



Severe black mat fungus infection of the dorsal carapace in each of two Tanner crabs (Photo: J. Frank Morado, National Marine Fisheries Service, Seattle)



GMS stain of black mat fungal hyphae and fruiting body penetrating the shell surface of an eyestalk in Tanner crab (Photo: J. Frank Morado, National Marine Fisheries Service, Seattle)