

# Digestive Tubular Degeneration and Bio-Fouling

---

## *I. Causative Agent and Disease*

Digestive tubular degeneration appears to be a non-infectious lesion of the hepatopancreas observed in only two captive golden king crabs collected from southeast Alaska. Whether the condition occurs in wild crabs or is related to the stress of captivity is not known but affected crabs appear clinically normal. Bio-fouling is the external growth of algae, bacteria, bryozoa, barnacles and other epibionts on the cuticle and shell surface of crustaceans. Generally, the presence of these epibionts causes no harm to the crustacean host. However, heavy growth on the surface of gills or eyestalks could reduce respiratory capacity and sensory perception, respectively.

## *II. Host Species*

Although noninfectious digestive tubular degeneration has been observed in only two captive Alaskan golden king crabs, the condition may occur in other captive crab species if related to stress. Bio-fouling may occur on any marine or freshwater crustacean species worldwide, the severity of which depends on the specific environmental conditions.

## *III. Clinical Signs*

Digestive tubular degeneration causes no outward clinical signs but is visible on necropsy as black, brittle sections of hepatopancreatic tubules. Histological sections indicate areas of yellow-brown atrophied and necrotic digestive tubule acini surrounded by normal tubules. No causative agent is apparent using conventional stains. Bio-fouling may or may not be apparent by gross observation depending on the degree and the nature of the epibiont growth. Routine histological sections confirm the presence of epibiont

growth.

## *IV. Transmission*

No infectious agent has been found for digestive tubular degeneration which may be related to the stress of captivity. Bio-fouling epibionts occur and reproduce in the water column and are passively transmitted horizontally.

## *V. Diagnosis*

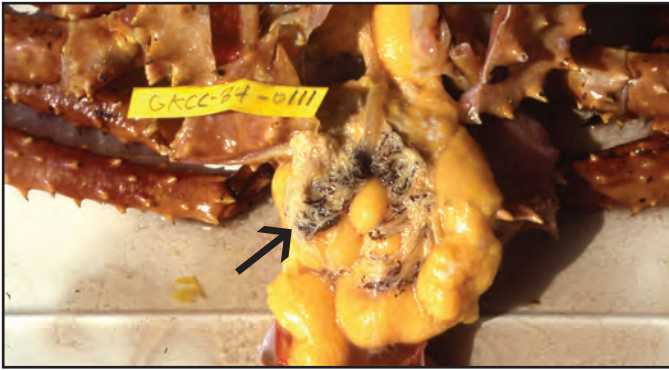
Digestive tubular degeneration is diagnosed by gross observation during necropsy and confirmed by histological examination. Bio-fouling may also be obvious but is confirmed by routine histological methods.

## *VI. Prognosis for Host*

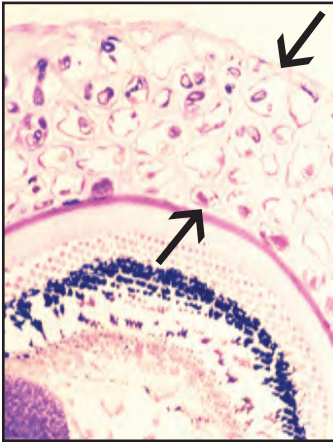
The clinical outcome of digestive tubule degeneration is unknown but affected crabs appear normal. Bio-fouling is generally harmless to adult crustaceans which shed the epibionts with the old shell during molting. Severe fouling of gills may result in shellfish mortality in areas having high organic pollution. Heavy epibiont growth by filamentous bacteria is known to cause mass mortality of captive larval red and blue king crabs when maintained at high densities.

## *VII. Human Health Significance*

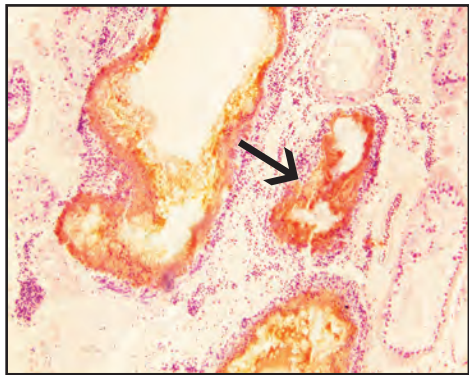
There are no zoonotic human health concerns regarding digestive tubular degeneration or bio-fouling in crustaceans.



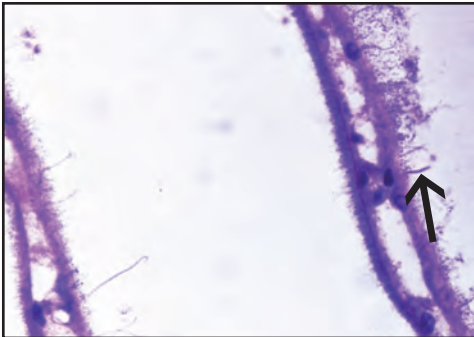
Female golden king crab with black sections of degenerated hepatopancreatic tubules (arrow); note normal yellow ovary underneath



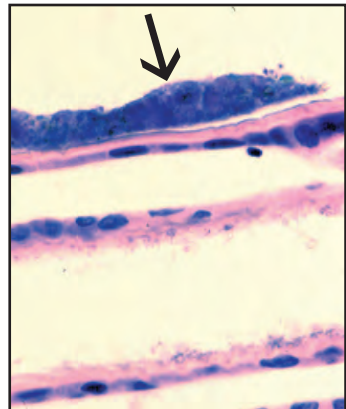
Histological section of eyestalk from Dungeness crab covered with bryozoan bio-fouling (arrows)



Atrophy and necrosis of tubule acini (arrow) in histological section of golden king crab with hepatopancreatic tubular degeneration



Histological section of gills from red rock crab demonstrating varied microbial bio-fouling (arrow)



Histological section of gills from blue king crab demonstrating bacterial bio-fouling (arrow)