



BACTERIAL DISEASES II



EDWARDSIELLOSIS

- Edwardsiellosis is acute or subacute or chronic bacterial disease of a variety of fish species caused by *Edwardsiella spp.* Characterized by **septicemic** picture and **abscess** formation.



EDWARDSIELLOSIS

- **Agent:** The genus *Edwardsiella* includes two species of bacteria that cause major disease in fish. *Edwardsiella tarda* infects fish and other animals while *E. ictaluri* infects fish only. Species of *Edwardsiella*, are a member of the Enterobacteriaceae, are small & straight rods.



EDWARDSIELLOSIS

Signs of *E. ictaluri* infection includes:

- Sudden decrease in feeding
- Spiraling and surfing
- Hang in the water column with head up and tail down.
- Open lesions found on the head of diseased



EDWARDSIELLOSIS

- White or hemorrhagic spots found in the skin.
- Ascitis
- Areas of hemorrhage may be observed at base of fins, around the head, operculum and abdomen.
- Liver has pale areas of tissue destruction.
- Petechial hemorrhages can be found in the muscles, intestine and fatty tissue.



EDWARDSIELLOSIS

- White spots on their internal organs
- Lesions associated with bacillary necrosis, are indeed characterized by multifocal irregular white spots of varying sizes on several organs including liver, spleen and kidney.
- Externally, the body color of diseased fish may be pale.



EDWARDSIELLOSIS

- May occur in an acute form, which is characterized by enteritis and septicemia with rapid mortality and a chronic form, which is characterized by meningoencephalitis with “hole-in-the-head” lesions.



EDWARDSIELLOSIS

- Signs of *E. tarda* infection:
- Clinical manifestation of *E. tarda* in mild infections is presence of small cutaneous lesions of approximately 3-5 cm in diameter which are located in the posterior lateral region of the body with progression of the disease,



EDWARDSIELLOSIS

- Abscesses develop in the muscle of the body and tail. These abscesses may become large and develop into gas filled hollow areas. From the surface, these are seen poorly pigmented, convex and swollen areas which if punctured emit a foul odour. This condition has given rise to the name *emphysematous putrefactive disease of catfish*. Small white nodules may be observed in the gills, kidney, liver and spleen. These nodules are packed with bacteria.



EDWARDSIELLOSIS

- **Treatment and control:**
- The disease can be treated with *oxytetracycline*

To control the infection, following steps must be taken:

- 1. Stress factors must be removed.
- 2. Removal of sick and dead fish as soon as possible.
- 3. Preventing infected animals from coming into contact with the fish farm.
- 4. Good management of fish farm.

A curved banner at the top of the slide features a microscopic image of E. tarda bacteria, which are rod-shaped with flagella, set against a blue background.

EDWARDSIELLOSIS

- **Zoonotic importance:**
- *E. tarda* is responsible for several clinical conditions in humans such as diarrhea gastroenteritis, typhoid-like illness, peritonitis with sepsis and induced abscesses in liver.



YERSINIOSIS (Enteric red mouth disease)

- Yersiniosis is one of the most significant bacterial infections in coldwater fish farms that cause significant mortalities and economical losses in the salmonids.
- **Agent:** *Yersinia ruckeri*
- A agent of a haemorrhagic septicaemia referred to as enteric red mouth disease.



YERSINIOSIS (Enteric red mouth disease)

- The principal clinical feature of congestion of the vessels of the oral area, with ulceration and haemorrhage, produced a distinctive, pathognomic lesion.
- Generalized haemorrhagic petechia over abdominal organs
- Swelling and redding of kidney and spleen



YERSINIOSIS (Enteric red mouth disease)

- Histologically:
- Liver, kidney and spleen have necrotic foci (which are granulomatous)
- Infiltrations leucocytes with erythrocytes.



EPITHELIOCYSTIS

- Epitheliocystis is a disease of the skin and gills of fish in both marine and freshwater species, characterized by the presence of “cysts” in the epithelial cells of the affected organs.



EPITHELIOCYSTIS

- Early morphological studies suggested that intracellular bacteria belonging to the orders **Chlamydiales** (Turnbull, 1993) and **Rickettsiales** (Zachary & Paperna, 1977) were the aetiological agents of epitheliocystis.
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EPITHELIOCYSTIS

- In the last decade, molecular studies have confirmed the former identification (Draghi et al., 2004) and have identified other pathogens from different phyla (Katharios et al., 2015; Mendoza et al., 2013; Seth-Smith et al., 2016), including novel taxa in the γ -proteobacteria and β -proteobacteria.



EPITHELIOCYSTIS

- Macroscopically, epitheliocystis presents as white nodular lesions in the gills and skin.
- Microscopically, infected epithelial cells progressively enlarge and contain bacteria-filled spherical cysts that are basophilic and encapsulated by a membrane



EPITHELIOCYSTIS

- Morphologies of Epitheliocystis Lesions
- Two types of inclusion morphologies were identified, both leading to hypertrophy of host epithelial cells.
- Histologically, the first inclusion was characterized by **compact dark basophilic central bacteria with formation of a clear halo around the bacterial cyst, leading to margination of the host cell nucleus**. This morphology is attributable to *Ca. P. salmonis* (type 1)
- The second cyst type was histologically characterized by **granular, loosely arranged basophilic bacterial material, with the host cell nucleus mostly not visible**, representing *Ca. C. salmonicola* (type 2)
- Cysts of both morphologies were also present on the same gill arch identified as mixed infection (type 3).



EPITHELIOCYSTIS

- **Treatment and control:**
- Apart from the use of antibiotics, several alternative strategies have been used to treat this disease.
- In 1998, sterilization of rearing water using ultraviolet light was reported.
- A number of trial epitheliocystis treatments have been conducted on juvenile tilapia



EPITHELIOCYSTIS

- (a) formalin (30 ppm); (b) salt (2 ppt); (c) benzalkonium chloride (2 ppm); (d) potassium permanganate (4 ppm); and (e) water exchange.
- Cysts were effectively reduced by all treatments, although mortality was best lessened by **water exchange** and least by **benzalkonium chloride**