

VIRAL DISEASES OF FISHES

cont.

■ **VIRAL DISEASES WITHOUT TUMOR FORMATION**

- VIRAL HAEMORRHAGIC SEPTICAEMIA(VHS)
- INFECTIOUS PANCREATIC NECROSIS(IPN)
- INFECTIOUS HEMATOPOIETIC NECROSIS(IHN)
- INFECTIOUS HYDROPS COMPLEX
 - 1)ERYTHRODERMATITIS OF CARP
 - 2)SPRING VIREMIA OF CARP
 - 3)VIRAL SWIM BLADDER INFLAMATIONS
- ULCERATIVE DERMAL NECROSIS (UDN)
- RED ILLNESS OF THE PIKE/Turna balığı
- VIRAL DISEASE OF THE CATFISH/Yayın balığı

■ **VIRAL DISEASES SHOWING TUMOR FORMATION**

- LYMPHOCYSTIC DISEASE (LCDV)
- CAULIFLOWER DISEASES OF FISH(STOMATO PAPILOMA)
- SMALLPOX

CHRONIC or TUMOR CHARACTERISTIC DISEASES

LYMPHOCYSTIC DISEASE (LCDV)

➤ **Agent:** Iridovirus

- It is more common in marine fish, characterized by the formation of round pearl-like nodules on the skin and fins. This is a chronic disease with low mortality.
- It is a slowly progressive infection that is noticed in 1-3 months.
- **Epizootiology:**
- Infection occurs directly contact with infected water and material.
- It is more common in flatfish (exm: Turbot).
- Some aquarium fish are susceptible to disease.
- The disease is tumor characteristic.
 - **Infection/transmission:**
 - The main source for horizontal contamination is contaminated water and virus spread. This situation causes the problem to increase in dense culture environments.
 - In cases where the fish population is high, it increases contamination because it can create lesions due to trauma.
 - The outer surface of the fish (epidermis) (including the gills) is the main source of getting into infection.
 - It is thought that the infection is not seen on the oral route.

- **SYMPTOM AND LESIONS:**

- Infection development depends on water temperature (incubation period is 1 - 2 months at 25°C).
- Nodules are noticed within 1 - 3 months.
- The nodules are light yellow in color and the size is between the millet and the size of the chickpea.
- In internal organs, lesions are rarely seen and are smaller.
- Lesions are not found in internal organs.

- **CONTROL:**

- There is no known treatment. Ill fish are destroyed,
 - Should be avoided from infected fish stocks.
 - Monitoring provides early detection, sterile soil filling or chemical treatment, efficient control with minimal inventory density.

- **DIAGNOSIS, PROTECTION AND SAFETY:**

- Clinical diagnosis is confused with some diseases (with tumors, protozoan diseases and fishpox disease).
- Laboratory diagnosis is difficult (due to failure of production in tissue culture)
- Protection is like it is in other viral infections.
- Prophylaxis and disinfection are important.

STOMATO-PAPILLOMA

- This disease are seen especially in the snake fishes. It is a sporadic, chronic disease that occurs in the mouth (lower and upper jaw).
 - Mainly in the dorsal and various parts of the body, with fibroepithelial features and formation of tumors in the **appearance of cauliflower**.
- **Agent:** Orthomyxovirus
- **EPIZOOTIOLOGY:**
 - it is believed that the transmission of the disease is caused by the entering of the agent via mouth and skin.
 - It is stated that environmental conditions, stress factors, genetic condition are important at the outbreak of the disease.
- **SYMPTOM AND LESIONS:**
 - Tumors develop slowly.
 - These are made of soft, vascular type that reaches nuts, walnut size.
 - In mouth localizations, animals can not take food, and because they can not feed, they are weak and die.
 - Initially white tumors return to brown afterwards and necrosis can be seen.
 - There is no lesion in internal organs.
 - **Histopathology:**
 - Pathological changes are rooted in the basal layer of the epidermis.
 - Over time, cuboidal cells rotate spindle-shaped.
 - Rugae are seen in the epidermis.
 - There is pigmentation in capillary vascular connective tissue and dermis outer layer.
 - **DIAGNOSIS:**
 - The course of the disease and lesions are important.
 - No **treatment** and patient fish are destroyed.

FISH POX

- ❑ Fish pox is a chronic infectious disease of fish characterized by white, fluffy spots, which are the result of skin hyperplasia.

- **Agent:** Herpesvirus (in DNA structure).
 - Fish pox disease affects especially cold-water fish (carp, aquarium and pond fish, etc.)
 - Low mortality, rarely causes deaths.
 - White colored bubbles that develop as a result of hyperplasia.
 - White / gray / pink, 1-3 mm raised lesions on skin and fins leave their place in overgrown papillomas.
 - The lesions fall off over time and leave the place to the scar tissue.
 - No lesions are seen in internal organs.
 - No treatment is done and the fish are destroyed. Increasing the temperature only temporarily removes the problems.

- ✓ **EPIZOOTIOLOGY:**
 - ✓ The disease is mostly seen in Carps.
 - ✓ It is rarely seen in some aquarium fish.
 - ✓ it is belived that the transmission of the disease is caused by the tearing of the mouth and skin.
 - ✓ The role of the environmental factors as well as genetic factors is found in the outbreak and spread of the disease.

- **SYMPTOM AND LESIONS:**

- The incubation period can be as long as 1 year.
- White, raised, 1-3 mm or larger stiff lesions on the skin and fins striking the pelvis.
- Similar occurrences occur around the mouth and fins.

- **In NECROPSY:**

- There are no abnormalities or metastases in internal organs.

- ✓ **Histopathology:**

- ✓ Hyperplasia in dermis cells
- ✓ Intracellular and nuclear inclusions are seen.

- ❖ **DIAGNOSIS:**

- ❖ Clinical diagnosis are confused with skin tumors and some protozoon diseases.
- ❖ Laboratory diagnosis is based on electron microscopy and cell culture.

Carp Pox diseases

MALLEYE SARKOMA-MALLEYE SARKOMA

- It is a viral disease characterized by dermal nodules.
Epitheliocystis Disease
It is a disease similar to the lymphocystis disease caused by Orphan virus.

PARASITIC DISEASES OF FISHES

- While there are many parasitic factors in fish, they can cause serious diseases and economic losses due to population density in fish farming (aquaculture), while these do not cause real damage in natural conditions.
- Since the parasites found in marine fish are very wide and natural conditions do not come up with important problems and since it has not been examined in detail, "fish parasites" are usually found in freshwater fish except a few breeds settled in sea fish;
- **Protozoan**
- **Arthropod**
- **Helminths**
 - Trematoda
 - Cestoda
 - Nematode
- **Hirudinea**
- **Acanthocephala**

Protozoan Parasites Of Fish

Genus: OODINIUM

These protozoons are round or pear shaped.

On the body there is a short extension in the form of a stalk.

It has a great nucleus.

They usually have a yellowish-colored pigment.

Important **specieses**;

Oodinium pillularis (Psinoodinium pillularis)

Oodinium ocellatum (Amyloodinium ocellatum)

Oodinium limnaticum

Oodinium pillularis (Velvet disease):

- It's in the dinoflagellata line.
- It is seen in fish that live in hot and cold freshwater.
- It is known as "**freshwater Oodinium**".
- It causes Pillularis disease. The protozoan in this disease is located in the gills, especially in the parts where the fins are tied down.
- It causes a "dusty" or "velvety" appearance on the fish.
- Parasite that causes the disease more popularly
- known as **Velvet**, Gold Dust or Rust disease.
- It appears as greyish-white or yellowish-brown dots
- when microscopically examined on slides laminated over fish.
- The immobile forms on the fish are seen in shapes ranging from the wheel to the pear.
- There is a thick cell membrane.
- The core/nucleus is large and round in shape.
- The granular cytoplasm is transparent.

- The average size is 50-70 μm .
- Parasite sit firmly on the surface of the fish, forming "rhizoid" and entering the cells.
- As they enter the cells, they make some secretions that dissolve the cells.
- **Developments**; the mature parasite leaves the fish, takes a rounded form and dumps to the bottom in the water.
- Divisions in nuclei and chromotomes come to the forehead and divide themselves into 2.
- It takes a rounded form again, forms a new membrane and continues to divide again, bringing 32-64 young cells and then moving young forms (Dinospor).
- Feeding is by photosynthesis.
- **The parasite biology** → a) It depends on the heat of the water,
- b) It depends on the degree of the enlightenment.
- **Diagnosis**; by taking the scraper and seeing the factors
- in the microscope.
- Formalin, salt water, malachite green can be use **for disinfestation**.
- Also, when the fish are taken out of the aquarium for bathing, the water temperature of the aquarium can be raised temporarily (30°C 24 hours) and the illumination is interrupted for a short period of time to prevent infection.

Oodinium ocellatum:

- It is known as 'seawater Oodinium'.
- It is mostly settled in coral fish, occasionally a problem in seawater aquariums.
- It is usually found in tropical fish because its development is at 25°C.
- The place where they first settled in the fish is the gills.
- The parasite is also located in the skin.
- The parasites on the fish are close to the round.
- The parasite size may vary. It is usually 20-70 μm . (Sometimes greater than 100 μm)
- The nucleus diameter in prepared dyes is 5-15 μm .
- There are small starch granules around the nucleus.
- The diseased fish have cysts in the gills.
- The cysts are 0.3 mm in diameter and very resistant to various chemical substances.
- **Biology** is similar to the previous species.
- After the parasite has left, it is divided into 2.
- In the next 3 days 256 dinospores will occur.

- Moving dinospores hold on to the fish.
- Parasites cause to hemorrhagic, inflammation and necrosis in the gills.
- They provide a basis for bacterial infections.
- Sick fish are without appetite, weakness is seen.
- In *Oodinium ocellatum*, rhizoids are ingested by partially ingesting the cells into the food vacuole as they penetrate the gill epithelium or epithelial cells of the skin (this epithelium is damaged).
- Difficulty in breathing and swimming disorders can be seen in sick fish.
- If the parasite is located on the skin, the skin will look pale.
- The gills are bulging, bloody and dirty.
- Examination of the gill or scrape taken is important.
- **Treatment and prevention** are like those in *O.pillularis*.
- Various bath are available **for treatment**, especially CuSO₄ (1.5 mg / l).
- Discharge of aquariums and disinfection of all materials is important.

- **Oodinium limneticum** and **Oodinium vastotor**
- The infestation is caused by a parasitic dinoflagellate that is variable in size, as the variants differ somewhat in their measurements.
- Other forms that cause very similar signs are ***Oodinium limneticum*** and ***Oodinium vastotor***.
- These can measure more than 100 microns although the more typical sizes are 50-70 microns.

TRICHODINA

- one of *Ciliata*.
- There are many species. The most common are *Trichodina domerqui* and *T. nigra*.
- It can be seen in forms ranging from barrel to tea saucer/plate in the microscope.
- They are approximately 30-40 μm in size.
- Sometimes it is possible to encounter specimens larger than 100 μm .
- Circular and forwardly movements of the parasites are characteristic when native preparations.
- Outside the body, there are cilia (eyelashes).
- On the inside there are radial needles.
- On the innermost side, there is a wider one, with the ends of the teeth being examined.
- Macro and micronucleus are obvious.
- The macronucleus is hemispheric or spirally curled (the helical nature of the nucleus is important in species determinations).
- They are seen in microscopic transparent or yellowish grayish color.

- Outside the body, there are cilia (eyelashes).
- On the inside there are radial needles.
- On the innermost side, there is a wider one,
with the ends of the teeth being examined.
- Macro and micronucleus are obvious.

- ❖ *Trichodina* are parasitized on the skin and gills of fish (*Trichodina* is found in urinary incontinence, urinary tract and oviduct as well as ectoparasites).
- ❖ The gills and the urinary system are responsible for throwing urea and ammonia into the body, and they have a cooperative effort. For this reason, it is also parasitized in these parts (Oviduct is due to neighboring organ, which is why it is infected).
- ❖ In fish, blurring in the skin and gills leads to the formation of uneven stains.
- ❖ Loosening and spillage are seen in the scale.
- ❖ non-severe infections do not matter.
- ❖ However, in severe infections, loss of appetite/anorexia and weakness occurs in fish.
- ❖ The settlements in the gills are more important.
- ❖ It causes an inflammation in the gills.
- ❖ Gill filaments and lamellae swell and stick together. Necrosis be formed.
- ❖ Since gills can not function, respiratory distress is seen in sick fish.

Trichodina on the gill

- **Trichodina** can be found in all fresh and salt water fish. It is also a problem in aquarium fish.
- If not diagnosed early, the parasites that multiply by dividing in two will cause severe infections in all fishes in a short time.
- **For DIAGNOSIS**; it is necessary to microscopically examine the skin, the fins and the gills taken from the gills between the lamellae and the agents should be seen.
- Sometimes it is necessary to prepare dyed preparations.
 - 2% AgNO₃ is poured on them (7-8 minutes).
 - The preparats are placed under UV light (20 minutes).
 - Examined in the immersion.
- **During the examination**, the size of the agents, the number of hooked teeth, the shape of the hooked teeth and the ability to stain the agent with AgNO₃ are considered.
- **In TREATMENT**; baths used for ectoparasites are used. Salt baths (in a 1% solution for about 30 minutes)
 - You can use the salt treatment or medicated treatments like potassium permanganate (works almost every time) or Malachite Green with Formalin or use Proform C (colder water temperature) or QuickCure (in warm water temperature).
- Besides Trichodina, the species DIPARTELLA, TRIPARTIELLA, TRICODINELLA and VAUCHOMINA also parasitized in the skin and gills in fish.
- **Trichodines** are not as common as these, but they also bring disease to the fish.
- At the gender level, the forms of arrangement of the cilium, the forms of the hooked teeth and the core structures are important.

- **Chilodonella** parasitize in the skin, fins and gills of fish.
- Reproduction in parasites occurs by transversal division.
- In inappropriate conditions, they form cysts that we can say "rest cysts".
- They are very durable and maintain their long-lasting vitality in the water and pool.
- The maximum yield is 5-14°C.
- For this reason they are particularly effective in cold weather, tropical fish species.
- However, they are also effective in trout and salmon as well as tropical fishes.
- Non-sever infections do not matter. However, in heavily infected fish, activity and decreased appetite are notable.
- The indication/symptoms of the disease often occurs more than once.
- **DIAGNOSIS** also; scraping preparations are prepared from skin, fins and gills.
- The prepared preparations should be examined under microscope to see the agent.
- In **TREATMENT**; ectoparasite baths (such as formalin, potassium permanganate, salt baths at 3%, malachite green, etc.) may be used.

ICHTHYOPHTHIRIUS

- They are rather big *ciliata*.
- The diameter is between 50 μm and 1 mm.
- For this reason, the preparations prepared can be recognized even from the outside.
- Body form is oval / round and elastic.
- If the little ones are transparent or whitish, they are the big ones.
- Every side of the body is covered evenly with cilia.
- Their movement is in the style of rolling.
- Macronucleus is quite characteristic and is shaped like a horseshoe.
- (It is very specific even in unpainted preparation).
- The micronucleus is not obvious and is found next to the macronucleus.

- In fish, it is settled especially in the skin and fins, and sometimes in the gills.
- There is no division when they are found in fish.
- Once separated from the body, the cyst can multiply.
- The proliferation is through cleavage, with younger forms of about 1000 small (30-40 μm) oval cypresses bringing them to the plant.
- The lifetime for young forms are 24 hours(they will die if they do not find new hosts)
- The lifetime of *Ichthyophthirius* varies from 4 to 10 days depending on the temperature.
- The optimum temperature for life is 24-27°C.
- In fish, small white fistulas are cause to the body (in the skin, fins and gills).
- For this reason it is known as "white spot" disease.

- Sick fish movements change.
- They often accumulate where the water comes from.
- The fish in the aquarium rub oneself against the sand or vegetation.
- In a similar way, because of parasitic irritations and pruritus, fish jump, jump out of the water.
- The only species is known. It is also *Ichthyophthirius multifiliis*.
- They are seen in all freshwater fish, especially those living in warm waters.
- In addition to tropical fish, they also cause severe parasites in salmon.
- **Diagnosis**; the control of scraping preparations prepared and the appearance of the agents.
- The **TREATMENT** is the same; ectoparasite baths (such as formalin, potassium permanganate, salt baths at 3%, malachite green, etc.) may be used.