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Lecture title: Nutritional Diseases

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Summary:

Nutritional diseases of fish may develop as a result of:

¬ Deficiency (undernutrition),

¬ Excess (overnutrition),

¬ Imbalance (malnutrition) of nutrients present in their food.

Nutritional imbalance can be caused by: ¬ An inability of the body to absorb certain nutrients or result from a poor diet

Varies with specific deficiency, but most common clinical signs include the following: **skeletal abnormalities**; **cataracts** or other **ophthalmic lesions**; **hematopathologies** (e.g., anemia)

Carbohydrates

Sekoke disease is one of the common diseases related to Carbohydrate. It is also called **Spontaneous Diabetes** in carp, the disease charactarized by ipid infiltration of parenchymatous organs, bilateral cataract and degenerative changes in extrinsic eye muscle, retina.

Lipids

Lipid defeciency lead to:

¬ Reduced growth ¬ Rapid swimming is followed by immobility and loss of reflex.

¬ Skin de-pigmentation. ¬ Fish may float or sink to the bottom

¬ Fins erosion. ¬ Ascetics

Proteins

All fish require high levels of protein for (30-36)% for protein synthesis and gluconeogenesis

common signs of protein and/or amino acid deficiency in fish are: ¬ **Reduction of growth rate** ¬ **Mortality** ¬ **Scoliosis and Lordosis** ¬ **Anemia** (Reduction of RBCs 750000/m3).

Majors Amino acid Defeciency

Amino acides	Defeciency symptoms
Lysine deficiency	cause dorsal fin erosion
Tryptophan, Leucine, arginine and histidine deficiency	cause spinal abnormalities
Methionine and tryptophan, Histidin	associated with cataract
Tryptophan	Scoliosis, lordosis, decrease caracass lipid, caudal fin erosion

Lipid -Soluble Vitamines

Vitamine A (1000-2000 IU)

- Hypovitaminosis cause rduce growth, exophthalmia, thickening deformation of the gill arch
- Hypervitaminosis cause necrosis of the tail, osseous dystrophy with nervous effects

Vitamine D (Calciferol) cause reduce grwoth rate and reduction in body calcium and potassium

Vitamin E (Tocopherol 80-100 mg/kg) it is metabolism linke with selenium its deficiency cause muscular dystrophy and liver steatosis

Vitamin K play role in blood clotting mechanisms its deficiency cause prolong clotting time and haemorrahge like viral haemorrhagic saptecemia

Water -Soluble Vitamines

Thiamine -B1 deficiancy of this vitamine cause by little dosage or less than normal , or by presenses of thiamenase(some fish as carp fish have high conentration of this enzyme) which is important in catalyzing carbohydrate.

Fish with B1 deficiency exhibite change in color, haemorrhage at the fin base with unsteady movemant and nervous signs

Riboflavine -B2 (7-10mg /kg)

This is a coenzyme for oxidase system important for repsiration of poorly vascularized tissue like cornea and lens of the eye.

Its deficieny in carp cause haemorrhage and congenetal dwarfism in catfish

Pyridoxine -B6 it is important for rapidly growing fish , its deficiency cause nervous signs and

Pantothenic acid (30-40 mg/kg) this coenzyme necessory for carbhydrate and fat metabolism, its deficiency cause nutrtional gill disease (hyperplasia and clubbing secondary gill filaments), fish respiratory disorder.

Ascorbic acid -Vitamine C deficieny cause reduction wound healing, skeletal malformation as spiral lordosis and scoliosis, spinal fracture, opercular and gill filament deformity, cartilage and osteoid replacemnet of many bony tissue.

Upper Scoliosis

Lateral curvature of the vertebral column

Lower Lordosis

Dorso-ventral curvature of the spine