

## Health status of a snakehead (*Channa punctatus*) of two fish markets in Mymensingh, Bangladesh

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### Abstract

An experiment was carried out for a period of six months during October 2008 to March 2009 to investigate the health status of a snakehead, *Channa punctatus* through clinical and histopathological technique. Fish were collected from two fish markets of Mymensingh district. Clinically and histopathologically, it was observed that fishes from both the markets were healthy in October and March but moderately affected in November and February. In the months of December and January, 7.5 - 8 % of the fishes were affected clinically and showing various clinical signs like, discolouration, deep ulcer, ill health, scale loss and rough skin. Histopathologically, in the month of December and January, major observed pathologies of skin and muscle were necrosis, vacuums, fungal granuloma and loss of dermis. Gills were affected having parasitic cysts, monogenetic trematode, clubbing, loss of primary and secondary gill lamellae, hemorrhage, necrosis and hypertrophy. Vacuoles, pyknosis, hepatic necrosis, hemorrhages and fungal granuloma were observed in liver. Renal pathology included necrosis and pyknosis of kidney tubules, hemorrhages, presence of bacterial colony and vacuoles. From present findings, it was found that, fishes from urban market were more affected with diseases than pre-urban market especially in the months of December and January when compared with other months. From overall observation, *C. punctatus* were severely affected by epizootic ulcerative syndrome (EUS), dactylogyrosis, protozoan and bacterial diseases during colder months of the year.

**Key words:** Health status, Snakehead, EUS, Clinical signs, Histopathology

### Introduction

In Bangladesh there are about 50-60 small indigenous species (SIS) which grow to a maximum length of 25 cm or 9 inches (Felts *et al.* 1996, Hossain and Afroze 1991). These SIS are very important and good resources to our poor and low income groups in terms of nutrition and economics which are abundant in most of the freshwater areas of Bangladesh. Fishes have been suffering from many diseases such as epizootic ulcerative syndrome (EUS), tail and fin rot, bacterial gill rot, dropsy, various types of fungal, protozoan, parasitic and bacterial diseases (Chowdhury *et al.* 1999). With the outbreak

of EUS in 1988 *Channa* sp and many other SIS were severely affected (Barua *et al.* 1989). During last few years the catfish and snakeheads are recorded as rare species from flood plains and *beels* due to diseases outbreak (Hossain and Mazid 1995). Fish of the local markets may have different health status, showing disease symptoms like scale erosion, tail and fin rot, ulcer etc. As we know, health condition of market fish is very much important when we consider public health. It is now become essential task of the scientists to investigate the types of symptoms (if any) and also whether the symptoms are already turned into diseases or not. In this regards clinical and histopathological techniques might be carried out which has been successfully used for diagnosis of fish diseases throughout the world. In Bangladesh, it has used in a limited extend to disease diagnosis in fish (Ahmed *et al.* 2000). Thus the present research work has been aimed to investigate health status of a snakehead *C. punctatus* from the fish markets of Mymensingh through clinical and histological measures.

## Materials and methods

The study was conducted for a period of six months from October 2008 to March 2009. Live snakeheads were collected fortnightly from two fish markets of Mymensingh such as pre-urban site- Kamal-Ranjit (KR) Market (located at BAU campus) and urban site- Shankipara Rail Crossing Market (located at Mymensingh town) by separate plastic container filled with water and immediately transported to the Fish Disease Laboratory of the Faculty of Fisheries, Bangladesh Agricultural University, Mymensingh. The sampled fishes were clinically examined by naked eye and magnifying glass to record any external signs, injury and other abnormalities. Organs like skin and muscle, gill, liver and kidney were collected with the help of a sharp scalpel and forceps and fixed in 10% neutral buffered formalin for histopathological study. After 8 hours of fixation, the samples were trimmed in order to obtain a standard size of 1 cm<sup>3</sup> (maximum) and placed in automatic tissue processor for dehydration, clearing and infiltration. The samples were then embedded, sectioned (5 $\mu$ m thickness) and stained with Haematoxylin and Eosin. Then the sections were mounted with canada balsam and covered by cover slips and examined under a compound microscope. Photomicrograph of the stained sections was obtained by using a photomicroscope. Record of structural variations and pathologies were done from the slides and photomicrographs (Ahmed *et al.* 2009).

## Results

Clinically, it was observed that, *C. punctatus* from both markets were apparently healthy and normal in appearance during the months of October and March. However, in November and February, mild signs like, lesions, rough skin, scale loss were observed. But, clinically, 7.5 - 8 % of the fishes were affected showing various signs like, discolouration, deep ulcer, ill health, scale loss and rough skin in the month of December and January (Table 1). Histopathologically, it was seen that skin and muscle,

gill, liver and kidney of *C. punctatus* were normal in the months of October and March from both the markets. However, in the month of November and February, pathological changes like mild necrosis, pyknosis, few vacuums and hemorrhages were observed and most of them are in healing stages. Pathologies of skin and muscle of fishes from both markets are includes partly loss of dermis and muscles, severe necrosis and presence of dense fungal granuloma during the month of December and January, (Figs. 1 and 2). In respect of gill pathology, loss of primary and secondary gill lamellae, hypertrophy, necrosis, haemorrhages, clubbing and monogenetic trematode were observed in the fishes of both markets during the month of December and January (Figs. 3 and 4). In liver, severe necrosis of hepatocytes, pyknosis, fat droplets, hemorrhages, fungal granuloma and wide vacuums were observed in liver of *C. punctatus* collected from Shankipara rail crossing market during the month of December and January (Fig. 5). In kidney of *C. punctatus*, collected from KR market, hemorrhages, severe necrosis, bacterial colony, pyknosis and vacuums were observed during the month of December and January (Fig. 6). From clinical and histopathological observations, it was seen that, fishes collected from Shankipara rail crossing market were more severely affected than fishes of KR market and more pathological symptoms were seen during the month of December and January, when compared with other months.

Table 1. Clinical signs and percentage of affected *Channa punctatus* in various months

Months		October	November	December	January	February	March
Species	Markets						
<i>Channa punctatus</i>	KR market (Prei-urban)	AN & HA (0.5 %)	rs & SL in some places (1.5 %)	rs & ulcer with SL (4.5 %)	ill body, Dc & DU in the body region (7.5 %)	rs & mild dermal lesion (2 %)	HA (0.0 %)
	Shankipara Market (Urban)	AN & HA (0.0 %)	AN & WB (2.0 %)	ill body & rs in 'v' & 'p' region (5 %)	Ulcer with SL in 'c' region (8 %)	rs & SL in some places (2.5 %)	AN & minor WB (0.4 %)

AN = almost normal	p = pelvic	c = caudal	rs = rough skin	HA = healthy appearance
DU = deep ulcer	v = ventral	Dc = discoloration	SL = scale loss	WB = weak body

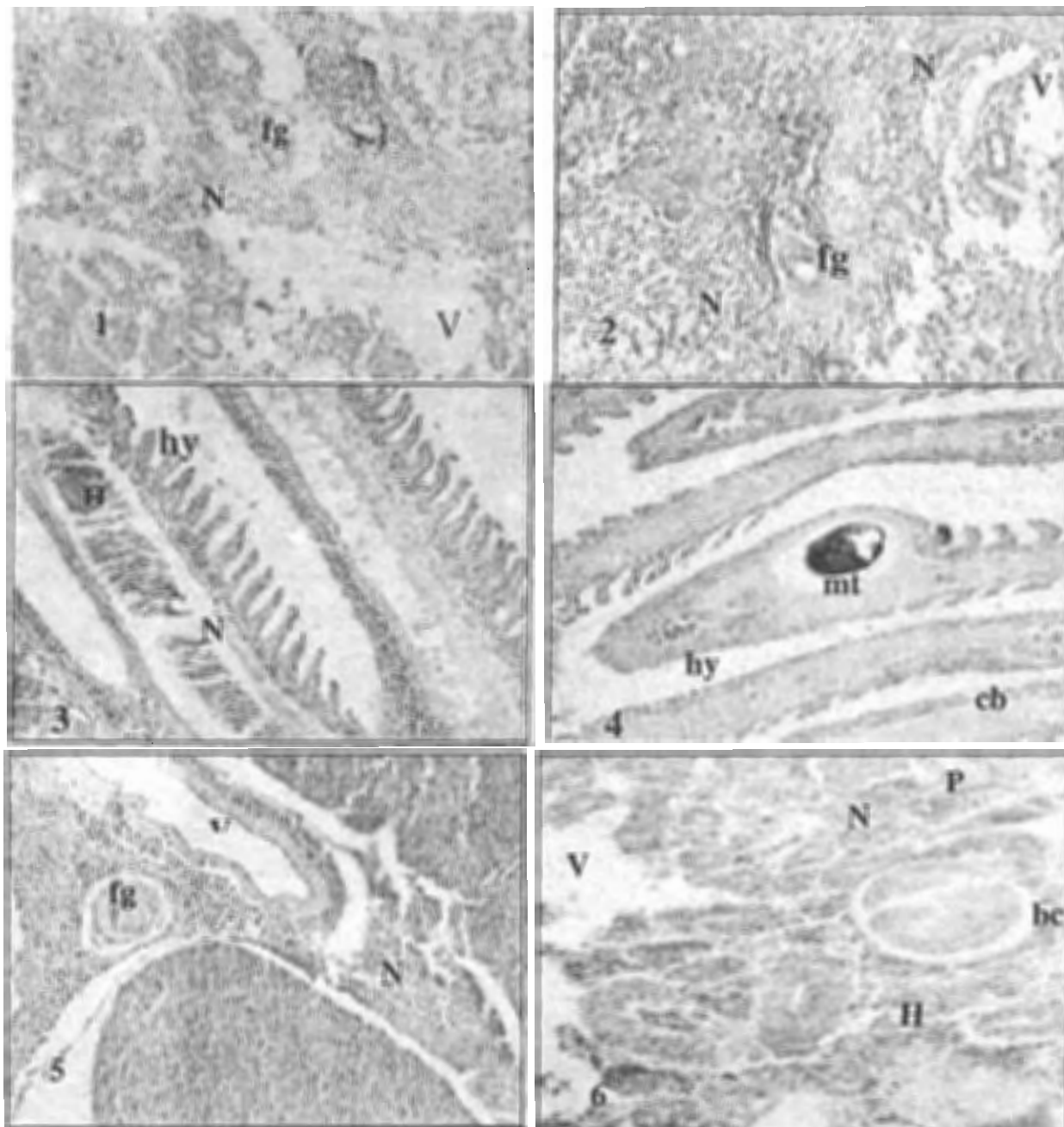


Fig. 1. Section of skin & muscle of Taki in December & January from peri-urban market. Dermis had necrosis (N), vacuums (V) and fungal granuloma (fg) were present in dermis & muscle. H & E x 215.  
 Fig. 2. Section of muscle of Taki in December & January from urban market. Necrotic muscle (N) with dense fungal granuloma (fg) and few vacuums (V) were found in epidermis & dermis. H & E x 215.  
 Fig. 3. Section of gill of Taki in December & January from peri-urban market. Secondary gill lamellae partly lost (↖) & primary gill lamellae were hypertrophied (hy), necrotic (N) & hemorrhagic (H). H & E x 215.  
 Fig. 4. Section of gill of Taki in December & January from urban market. Missing lamellae (↖), hypertrophy (hy), clubbing (cb) and monogenetic trematode (mt) were found. H & E x 215.  
 Fig. 5. Section of liver of Taki in December & January from urban market. Vacuums (V), necrosis (N) and fungal granuloma (fg) were found. H & E x 140.  
 Fig. 6. Section of kidney of Taki in December & January from peri-urban market. Hemorrhages (H), necrosis (N), vacuoles (V), pyknosis (P) and bacterial colony (bc) were observed. H & E x 330.

## Discussion

From the result of the present study, clinically and histopathologically, it was observed that snakeheads from both the markets were healthy during the months of October and March. However, in November and February, mild clinical signs like, lesions, rough skin, scale loss and reduced pathological changes like mild necrosis, pyknosis, few vacuums and hemorrhages were observed. On contrast, severities were increased during the months of December and January, when compared with other months and clinical signs like, discolouration, deep ulcer, ill health, scale loss and rough skin were observed. Hossain (2008) mentioned that, clinical symptoms like scale loss, dermal lesion, loss of caudal fin were seen in December and January. Marma *et al.* (2007) mentioned that, in October and November, fishes were normal but severely affected during the months of December and January. These findings were almost similar with the works done by Patwary *et al.* (2008), Ahmed *et al.* (2007), Akter, *et al.* (2006), Ahmed *et al.* (2005), Ahmed *et al.* (2004), Ahmed *et al.* (2000) and Islam *et al.* (1999).

During the month of December and January, marked pathological changes like, partly loss of dermis and muscle, severe necrosis, presence of dense fungal granuloma were observed in skin and muscle of *C. punctatus* from both the markets. The presence of fungal granuloma in the organs indicate that the fishes were affected by epizootic ulcerative syndrome (EUS). Noga and Dykstra (1986) were of the opinion that marked granulomatous inflammatory response were shown by fish infected with *Aphanomyces* sp. Hoque *et al.* (1999) mentioned that partial loss of epidermis and dermis, muscle necrosis, pyknosis, vacuums and presence of fungal granuloma were the pathological changes in skin and muscles of EUS affected fishes of Bangladesh.

Major gill pathologies were included loss of primary and secondary gill lamellae, hypertrophy, necrosis, hemorrhages, clubbing and presence of monogenetic trematode during the month of December and January. Ahmed *et al.* (1998) observed loss of secondary gill lamellae, clubbing, hypertrophy, protozoan cyst in gill of juvenile Indian major carp when investigated through histopathological measures. Roy *et al.* (2006) reported cysts, hyperplasia, lamellar clubbing and hypertrophy in EUS affected *C. punctatus*, *M. tengara* and *H. fossilis*. Parveen *et al.* (2005) also mentioned that in December and January marked hypertrophy and hyperplasia were observed in gill lamellae of *C. punctatus* and *N. nandus*.

During the month of December and January, severe necrosis of hepatocytes, pyknosis, wide vacuoles, fat droplets, hemorrhages and fungal granuloma were evident in liver of *C. punctatus*. Ram and Singh (1988) were observed various histopathological changes in liver of fish like cytoplasmolysis, nuclear pyknosis and necrosis leading to complete exhaustion and disintegration of hepatocytes. Akter *et al.* (2006) observed vacuums, hepatic necrosis, fungal granuloma and pyknotic hepatocytes in liver of *Channa punctatus*, *Heteropneustes fossilis* and *Mystus tengara*. Almost similar findings were recorded by Joshi *et al.* (2007). Ahmed *et al.* (2004) found marked necrosis with blood cells, pyknotic cells and many fungal granulomas in liver of *C. punctatus* in the months

of December and January. Kumar *et al.* (1991) observed marked pathological changes in the liver of EUS affected *Puntius*, *Mastacembelus* and *Channa* in India.

In kidney of *C. punctatus*, hemorrhages, necrosis, pyknosis, bacterial colony and vacuums were seen in December and January. Alam (2004) found that kidney, spleen and liver were swollen and enlarged during colder months. Ahmed and Hoque (1999) also reported that internal organs like kidney and liver were more affected and disease like EUS occurred during the months of December and January.

Most of the examined snakeheads from both of the markets were apparently healthy from external observations, but under histopathological observations it was found that a high percentage (%) of fishes was affected by pathogens especially by fungus. Clinically and histopathologically, the snakeheads of urban market (Shankipara Rail Crossing Market) were more severely affected with diseases than fishes of peri-urban market (KR market) during the months of December and January. The overall observed diseases of fishes from both the markets were epizootic ulcerative syndrome (EUS), dactylogyrosis and protozoan diseases. Ahmed *et al.* (2004) investigated health status of three SIS and found that all fishes were severely affected in the months of December and January.

Fish collected from distant *beels*, adjacent to rail line, dirty floor and unhygienic drainage system of urban market could influence to deteriorate the health condition of the fishes. So steps should be taken from all counterparts to overcome these problems. Infrastructure facilities of the market should be developed and hygienic condition should be updated. In such ways diseases in fish could be reduced and health status of fishes in the markets could be kept safe to a great extent.

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