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HISTOLOGICAL CHANGES OF STURGEON FISHES IN RESERVOIRS OF ZHARKENT REGION

K. Sh. Nurgazy, K. K. Kayrullaev, G. A. Kulmanova,
B. O. Nurgazy, A. Iskakbaev, F. A. Turganbaeva

Kazakh National Agrarian University, Almaty, Kazakhstan

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Abstract. The article presents data on histological investigation the sturgeons organs from Zharkent region reservoirs in 2015. The results of the study led to give conclusion that the environmental situation and the condition of reservoirs in the region are tolerable.

Introduction. In our country, more and more pay great attention to the sturgeon. In this regard, created and successfully operate fish farms engaged in production of meat delicacies - caviar and sturgeon meat. Therefore, epizootic monitoring of fish becomes mandatory for many diseases. Histological method is not always possible to accurately diagnose the disease. However it gives the answer, how deep in the tissue and cellular level has gone pathological process and how widely affected all investigated fish herd. Wherein organs of apparently healthy fish at the tissue level may be at different stages of pathology, which allows determining the degree of damage in the whole herd [1]. Histopathological changes are

integral result of various biochemical and physiological changes in the body [2, 3]. Identification of emerging pathologies and disfunctions in the systems of fish' organisms is important to understand the reasons of reducing or disappearance of fish populations, to predict changes in the conditions of decreasing or increasing of toxic load, as well as strategy of development and methods of preservation, also restoration of fishery resources [4]. Morpho-pathological studies of Volga fish have shown that the condition of organs and tissues related with environmental condition, nature of distribution of contaminants in the water area of the reservoir and particular qualities of ecology [5].

The aim of our study was to investigate the histological changes of sturgeon.

Material and Methods. Sturgeons have been investigated for histological changes of gills, gonads, liver and muscles. The material was collected in condition of pond farms at Zharkent region in 2015 Histological preparations were prepared by conventional methods [6, 7]. There were prepared and analyzed 27 histological preparations. Histological analysis of the reproductive system was produced on 5 milts and 9 ovaries.

Results and Discussion. Histological examination of the above organs revealed that the majority of surveyed fish has got histologic pathology in more than one organ.

Gill pathology. Gills are the body which directly contacted with the external environment and, therefore, have a direct impact of adverse factors, including complex pollutants. Condition of tissue structures of this organ and individuals in general depends on the quality of environment.

Light histologic abnormalities were characterized by elongation and deformation of the respiratory lamellae. Moderate deviations in the gills appear as hyperplasia of their end sections, hyperemia of filaments. There was hypoplasia, deformation of respiratory lamellae, desquamation of the respiratory epithelium. Difficult morphological changes were expressed in underdevelopment, distortion, merging of respiratory lamellae on large plots. In individual fish was marked atrophy of the respiratory lamellae, exposure of one side of the gill filaments.

Gonad Pathology. The main condition for sustainable existence of population is its reproductive potential, caused to both: population size and population structure, and physiological features of functioning of the reproductive system which determined their individually fertility [8]. Therefore, histological studies of the reproductive systems of fish are highly relevant for the assessment of sustainability and the reproduction capacity of population.

Light morphological abnormalities in the ovaries were characterized by deformation of oocytes in the stage of protoplasmic growth and by karyopyknosis of nucleus. There were oocytes at the stage of nuclear fission. It was noted a small number of oocytes among the large number of fatty tissue. In the testicle at the stage of spermatogonia reproduction marked small cavity between the seminiferous tubules. Most of the examined milts had normal structure.

The share of fish with slight morphological changes was 72%. 28% of fish weren't revealed abnormalities in the gonads. Histopathological index was 1.7 points, which corresponds to the light degree of disturbance.

The pathology of liver. The liver is the main organ of detoxification of poisons enters the body. It not only accumulates the majority of poisons, but also displays the metabolites through the bile. The liver is not exposed to the direct impact of adverse environmental factors, such as gills, but they influence its structure and function indirectly - through the blood and lymph systems. Light Histopathological abnormalities in the liver were evident by fatty degeneration of hepatocytes, presence of lymphoid cells clusters and granules of hemosiderin pigment. Observed hyperemia of blood vessels.

Moderate morphological abnormalities in the liver characterized by necrosis of hepatocytes, the displacement of the nucleus from the center to the periphery of hepatocytes, also nuclear pyknosis. It is significant accumulation of hemosiderin granules and lymphoid cells.

Pathology of muscles. Light histopathological abnormalities in cross-striated muscle tissue on the lengthwise sections characterized by the curvature of muscle fibers. There were minor lipid inclusions. On cross section bundles of muscle fiber were somewhat divided. It was noted the presence of optical cavities at the periphery of myofibrillar fields.

Moderate morphological abnormalities in the longitudinal sections expressed in deformation and pulping myofibrils. Between parallel rows of fibers marked lipid inclusions. There was the presence of blood cells in the intramuscular space. In transverse sections the individual fibers in the fascicle are absent

and replaced by lipid inserts, which on the preparations shown as the form of Cellular optical cavities. Heavy histopathological abnormalities in the longitudinal sections of muscle tissue are evidenced in the lysis of myofibrils with formation of detritus. Marked faltering course of fiber were exchanged by lipid and connective tissues. In the intramuscular tissue there are blood cells. On the transverse section noted disintegration of fiber and lysis of myofibrils.

Results of histopathological analysis of sturgeon organs and tissues

Organs and fibers	Pathology level	Average histopathology index (баллы)
Gills	5,3% - light (1 x 2 point) 68,4% - mild (13 x 3 point) 26,3% - heavy (5 x 4 point)	3,2
Gonads	28% - normal (5 x 1 point) 72% - light (13 x 2 point)	1,7
Liver	5% - normal (1 x 1 point) 75% - light (14 x 2 point) 20% - temperate (4 x 3 point)	2,2
Muscle	16% - light (3 x 2 point) 63% - temperate (12 x 3 point) 21% – heavy (4 x 4 point)	3,1

Thus, on average, for all investigated sturgeon histopathological index of gills were 3.2 points, which corresponds to moderate deviations (Table). Histopathological index in the gonads has averaged 1.7 points, which corresponds to a slight abnormalities in the reproductive system. Histopathological index of liver was 2.2 points, which corresponds to a slight morphological abnormalities. Histopathological index of muscle points was 3.1, which corresponds to moderate deflections in their structure.

Gill apparatus of fish - most reactive body, first of all sustain the action of surrounding background is in the high functional stress caused any pollution. Histopathological abnormalities in the gills were appear augmentation and deformation of respiratory lamellae, desquamation of respiratory epithelial, hyperplasia of the end sections of lamella, temperate hyperemia of filaments. There are several stages of morphological changes in gill apparatus under the influence of environmental factors. In the first stage, take place the adaptive-compensatory adjustment without any pathological nature. In the second stage there are structural disorders of the respiratory and gusset epithelium. These disorders lead to significant organ disfunctions, loss of body ions or dehydration, but the complete destruction of the epithelium and the lamellae does not occur, so this situation is in principle reversible.

Due to the high functional specialization liver plays an important role in maintaining homeostasis. Histological changes and liver damages can be classified in order of importance for the functional condition of organ (reversible and irreversible, breaking its function or not) and on structures and physiological processes in which the change occurs. According to the physiological and histological condition of liver it can be successfully and comparatively accurately judged about state of external conditions of particular individual environment. Histopathological aberrations in the liver generally described as lightweight. There was a slight fatty degeneration, focal necrosis of hepatocytes, small clusters of lymphoid cells and hemosiderin granules, pyknosis of nucleus, congestion of blood vessels.

Histopathological abnormalities in the muscles of the investigated sturgeon were temperate on average and characterized by deformation, bending and pulping myofibrils. On the cross sections indicated the presence of optical cavities. In more severe cases there was signed lysis of myofibrils with the formation of detritus. Research muscles in sturgeon showed that those changes are reversible.

We know that the greatest number of violations in the gonads of sturgeon falls on sexually mature fish, in young individuals observed the normal development of sexual cells and gonads [9]. In our studies, we studied gonads only from juveniles. That's why it is explained relatively low degree of abnormalities

in the gonads. Abnormalities in the reproductive system has slightly character. Histopathological abnormality in the ovaries of studied sturgeons appears in deformation of oocytes in protoplasmic growth stage and pyknosis of nucleus. Most examined milts were at the stage of spermatogonia multiplication and had normal structure. Light histopathological abnormalities appear in the presence of empty spaces between milt ampules.

Thus the internal organs and tissues (gonads, liver, muscles) negative externalities indirectly through the blood and lymph, while the gills exposed to immediate direct impact of negative environmental factors. This, perhaps, explains the deviation in the gills, although in general they have been modest.

Conclusion. Based on the foregoing, it can be concluded that the results of histopathological examination of some of sturgeon showed that the state of water in the reservoirs of Zharkent region is satisfactory.

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ЖАРКЕНТ ӨҢІРІ СУ ҚОЙМАЛАРЫНДАҒЫ БЕКІРЕ БАЛЫҚТАРЫНДАҒЫ ГИСТОЛОГИЯЛЫҚ ӨЗГЕРІСТЕР

Қ. Ш. Нұрғазы, К. Қ. Қайруллаев, Г. А. Күлманова, Б. Ө. Нұрғазы, А. Ысқақбаев, Ф. А. Тұрғанбаева

Қазақ ұлттық аграрлық университеті, Алматы, Қазақстан

Тірек сөздер: гистопатология, бекіре балықтары, желбезектер, бауыр, гонадалар, бұлшық еттер, гистопатологиялық индекс.

Аннотация. Мақалада Жаркент өңірі су қоймаларындағы бекіре балықтарын 2015ж. гистологиялық зерттеу жөнінде мәліметтер келтірілген. Зерттеу нәтижесі бойынша осы аймақтағы экологиялық жағдай мен су қоймаларының күйі қанағаттанарлықтай деп тұжырым жасалынды.

ГИСТОЛОГИЧЕСКИЕ ИЗМЕНЕНИЯ У ОСЕТРОВЫХ РЫБ В ВОДОЕМАХ ЖАРКЕНТСКОГО РЕГИОНА

К. Ш. Нургазы, К. К. Кайруллаев, Г. А. Кулманова, Б. О. Нургазы, А. Искакбаев, Ф. А. Турганбаева

Казахский национальный аграрный университет, Алматы, Казахстан

Ключевые слова: гистопатология, осетровые рыбы, жабры, печень, гонады, мышцы, гистопатологический индекс.

Аннотация. В статье приведены данные по гистологическому исследованию органов осетровых рыб в водоемах Жаркентского региона в 2015 г. Результаты исследования позволили сделать заключение о том, что экологическая ситуация и состояние водоемов в данном регионе являются удовлетворительными.

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