

UDC 639.311: 614.3(477)

BIOLOGICAL HAZARDS OF FISH FARMING IN UKRAINE

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It was conducted monitoring of biological hazards of fish farming in Ukraine for the period 2002 – 2013 . Was established that biological hazards for the period 2002 – 2013 are presented by pathogens of infectious (20 %) and invasive (80 %) diseases. Among infectious diseases in aquaculture of Ukraine there are 15 % – fungal infections, and diseases of bacterial and viral etiology – 5 %. Invasive diseases are presented by pathogens of protozoal diseases – 60 %, monohenoyidozy and trematodozy – 20 %, tsestodozy – 10 %, arahnoentomozy – 7 % and nematodosiss – 3 %. It was also noted infection by parasites.

Key words: *fish farming, aquaculture, water resources, biological hazards, pathogens, infectious and parasitic diseases of fish.*

The modern strategy of social and economical development of Ukraine provides increasing the agricultural potential of the country. Fishing industry is one of the leaders in the structure of food industry in Ukraine. Basic principles of development and functioning of fish farming (aquaculture) in Ukraine are regulated by the Law of Ukraine "About aquaculture" [1].

According to the Law the **fish farming (aquaculture)** – is the agricultural activities of artificial breeding, keeping and growing **objects of aquaculture** in whole or in part controlled conditions for to obtaining agricultural products (**aquaculture production**) and its implementation, feed production, reproduction of biological resources, conducting selection and breeding work, introduction, resettlement, acclimatization and re-acclimatization of aquatic organisms, replenishment of water biological resources, preservation of biodiversityas and also providing recreational services.

The objects of aquaculture are hydrobionts which are used for the purpose of breeding, keeping and growing in terms of aquaculture.

On the areas of activities fish farming (aquaculture) in Ukraine can be carried out to: obtaining marketable products of aquaculture and its further implementation (**commodity aquaculture**), artificial breeding (**reproduction**), cultivation of aquatic biological resources, providing of recreational services.

The main directions of receiving of commodity aquaculture in Ukraine are fodder, pond and industrial:

– **fodder aquaculture** is the activity of extensive aquaculture of cultivation objects by adding different age groups of hydrobionts, obtained in terms of aquaculture, to the fishing water bodies (or their parts) for increasing the efficiency of bioproduction potential;

– **industrial aquaculture** is the activity of artificial breeding, keeping and growing of aquaculture objects with using the fish-breeding and floating gardens, fish-breeding pools and other technological devices, including the use of closed water systems;

– **pond aquaculture** is the activity of breeding, keeping and growing of aquaculture objects using the fish-breeding ponds, artificial reservoirs (channel, beam or dam ponds) which are separated from the mother water bodies (parts), estuaries, flooded peat quarries etc.

In Ukraine there are large areas of inland waters that are suitable for growing fish (aquaculture). The availability of water resources for growing aquaculture objects exceed 1 mln. ha, including: reservoirs – nearly 800 thousand. ha, ponds – 122.5, lakes – 86.5, 13.5 of cooling ponds and other categories – 6 th. ha.

The data of statistical reporting indicate that there were 20198 ponds, 20 reservoirs and 11 estuaries in Ukraine in 2013. Such areas as Vinnitsa (4008), Kharkiv (2603), Kirovograd (1182), Poltava (1117), Cherkasy (1112) and Ivano-Frankivsk (1048) are the leaders of fish breeding in Ukraine. What about reservoirs the largest number (5) is used for the production of aquaculture only in Dnipropetrovsk region. And we see an estuaries only in Mykolaiv (4), Odessa (4), Zaporizhzhya (2) and Kherson (1) areas.

In Ukraine natural waters is also represented by the Black and Azov seas, about 71 ths. rivers with the total length 248 thousand. km. The largest rivers of Ukraine are: the Dnipro, the Dniester, the Southern Bug, the Desna, the Seversky Donets and others.

The development of the fishing industry depends on early detection and elimination of factors (hazards) which affect on the value of fish and fish products in general.

Hazard is any biological, chemical or physical agent or condition of the animal, capable to be causing adverse effects on health [2].

As for fish farming, there are some dangerous ones: water pollution from sewage, using the fields those are directly next to the pond pesticides, defective food and raw materials which are used for feeding fish, failure sanitary requirements for water in ponds, fish diseases (alimentary infectious and invasive). The last is one of the most common and most unprofitable hazards which affect on the quality and safety of fish and fish products.

The biological hazards are originating from live objects. All objects of the living world can be divided into several kingdoms: bacteria, fungi, plants, animals, people. Carriers or substrates, of biological hazards are all habitats (water, air, soil), flora and fauna, people, artificial world that is created by man and other facilities. Biological hazards may have different effects on the animal – mechanical, chemical, biological and others. The result is various diseases which affect in our case on the quality and safety of fish and fish products, namely: nutritional (avitaminosis, toxemia), infectious (bacterioses and virozy), invasive (ecto – and endoparazytozy) [3].

Consequently monitoring of biological hazards that affect on the quality and safety of fish and fish products in Ukraine is very important.

The purpose of research. Monitoring of biological hazards of fish farming in Ukraine for the period 2002–2013 .

Material and methods of research. Monitoring of biological hazards of fish farming in Ukraine for the period 2002–2013. It was carried out under conditions of parasitological research department SSRILDVSE Kyiv. It was served the material of

research as data analysis of statistical reporting of state laboratories of veterinary medicine in Ukraine. It was used statistical and analytical method for the analysis of documentation in this paper.

Results. Number of sick fish in the territory of Ukraine for the period 2002–2013. It was shown in Figure 3.

The data of figure shows that the number of sick fish in Ukraine for the period 2002–2013 was amounted to 4.3 % of the total number of fish.

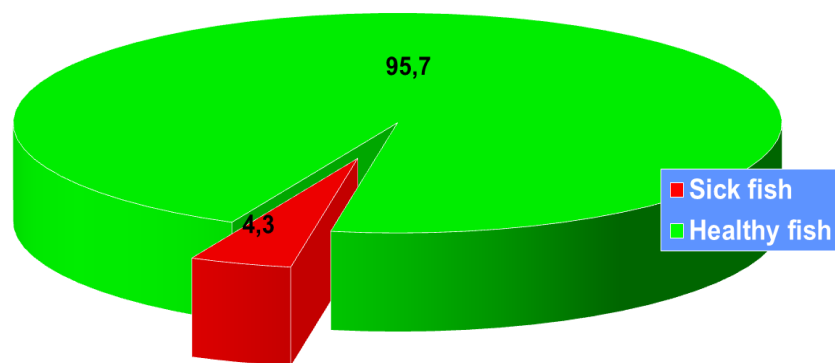


Fig. 1. Number of sick fish in the territory of Ukraine for the period 2002 – 2013

It should be noted that the percentage of fish incidence of infectious diseases was 20 %, namely: **mycosis** – 15 %, and diseases of bacterial (aeromonas, psevdomonoz, flavobakteriozy, yersynioz, BHN – Renibacterium salmoninarus) and viral etiology (*Viral haemorrhagic septicaemia* (VHS), *Infectious pancreatic necrosis* (IPN), *Infectious haematopoietic necrosis* (IHN), *Spring viraemia of carp* (SVC), pike lymphosarcoma) – 5 %, **invasive** – 80 % (fig. 2).

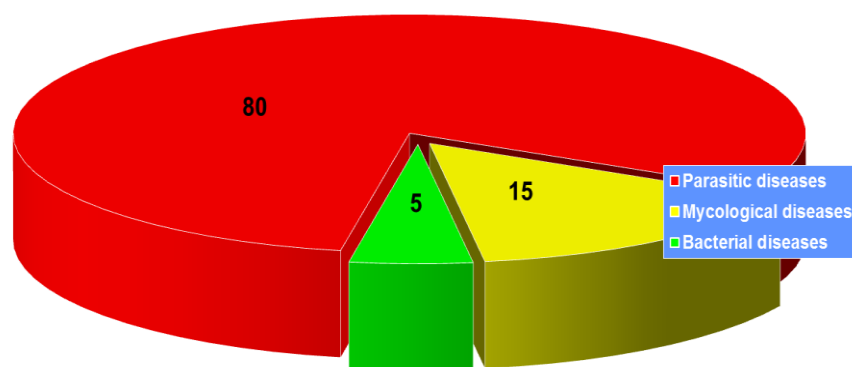


Fig. 2. Biological hazards of fish farming in Ukraine for the period 2002-2013

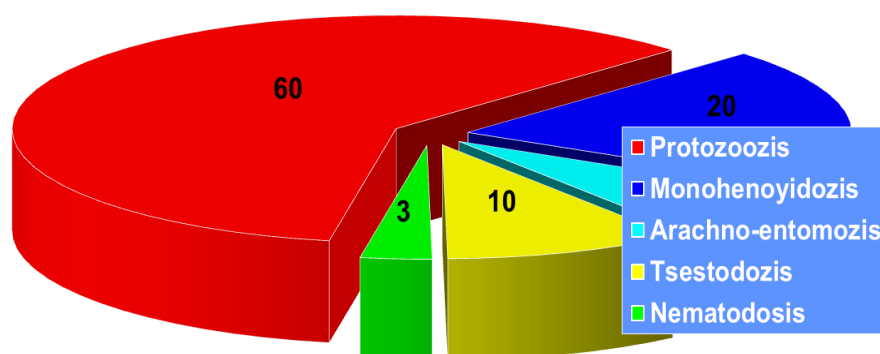


Fig. 3. Invasive fish diseases in the territory of Ukraine for the period 2002-2013

Among infectious diseases (fig. 3) **protozoozsis** (*Ichthyophthirius multifiliis*, *Trichodiniae sp. ma Chilodonela ciprini*) – 60 %, **monohenoyidozis** (*Dactylogyrus vastator*, *Gyrodactylus extensus*) and **trematodosis** (*Diplostomum sp.*) – 20 %, **tsestodozis** (*Bhotriocephalus gowkongensi*, *Ligula interstinali*, *Caryophyllaeus fimbriceps*, *Khawia Sipensis*, *Valipora campylancristrota*) – 10 %, **arachno-entomozis** (*Lernaea cyprinacea*, *Ergasilus sieboldi*, *Sinergasilus major*, *Argulus foliaceus*) – 7 %

and **nematodosis** (*Philometridae*) – 3 %. It was also noted infection by **parasites**. – *Ichthyophthirius multifiliis*, *Trichodina sp.*, *Dactylogyrus vastator*, *Gyrodactylus elegans*, *Diplostomum spathaceum*, *Lernea cyprinacea*.

Conclusions

1. Biological hazards of fish farming in Ukraine for the period 2002–2013 are presented by pathogens of infectious (20 %) and invasive (80 %) diseases.

2. Among infectious diseases of fish farming in Ukraine mycosis – 15 %, and diseases of bacterial (aeromonas, pseudomonosy, flavobakteriozy, yersynioz, BHN – *Renibacterium salmoninarum*) and viral etiology (Viral haemorrhagic septicaemia (VHS), Infectious pancreatic necrosis (IPN), Infectious haematopoietic necrosis (IHN), Spring viraemia of carp (SVC), pike lymphosarcoma – 5 %.

3. Infectious diseases are caused by protozoosis (*Ichthyophthirius multifiliis*, *Trichodinae sp.* та *Chilodonella ciprini*) – 60 %, monohenoyidosis (*Dactylogyrus vastator*, *Gyrodactylus extensus*) and trematodosis (*Diplostomum sp.*) – 20 %, tsestodozis (*Bhotriocephalus gowkongensi*, *Ligula interstinali*, *Caryophyllaeus fimbriceps*, *Khawia Sipensis*, *Valipora campylancristrota*) – 10 %, arachno-entomozis (*Lernaea cyprinacea*, *Ergasilus sieboldi*, *Sinergasilus major*, *Argulus foliaceus*) – 7 % and nematodosis (*Philometridae*) – 3 %. It was also noted infection by parasites. – *Ichthyophthirius multifiliis*, *Trichodina sp.*, *Dactylogyrus vastator*, *Gyrodactylus elegans*, *Diplostomum spathaceum*, *Lernea cyprinacea*.

Prospects for further research

In order to receive safety and high quality of aquaculture products it is necessary to do:

1) to conduct systematic monitoring of the health of fish (depending on the technology of cultivation and breeding);

2) to use modern approaches and methods of diagnosis and detection of dangerous pathogens;

3) to introduce a system of food safety management which based on the concept of risk analysis at the enterprises with aquaculture production.

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БИОЛОГИЧЕСКИЕ ОПАСНОСТИ РЫБОВОДСТВА В УКРАИНЕ

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Аннотация. Проведен мониторинг биологических опасностей рыбоводства Украины за период 2002 – 2013 гг. Установлено, что биологические опасности рыбоводства в Украине за период 2002 – 2013 гг. Представлены возбудителями инфекционных (20 %) и инвазионных (80 %) болезней. Среди инфекционных болезней рыб в аквакультуре Украины 15 % – микозы, а заболевания бактериальной и вирусной этиологии – 5 %. Инвазионные болезни представлены возбудителями протозойных болезней – 60 %, моногенотозы и трематодозы – 20 %, цестодозы – 10 %, арахноентомозы – 7 % и нематодозы – 3 %. Также отмечено паразитоносительство.

Ключевые слова: рыбоводство, аквакультура, водный фонд, биологические опасности, возбудители, инфекционные и инвазионные болезни рыбы

БИОЛОГІЧНІ НЕБЕЗПЕКИ РИБНИЦТВА В УКРАЇНІ

Н. А. Меженська, С. В. Бубела

Анотація. Проведено моніторинг біологічних небезпек рибництва України за період 2002 – 2013 рр. Встановлено, що біологічні небезпеки рибництва в Україні за період 2002 – 2013 рр. представлені збудниками інфекційних (20 %) та інвазійних (80 %) хвороб. Серед інфекційних хвороб риб в аквакультурі України

15 % – мікози, а захворювання бактеріальної та вірусної етіології – 5 %. Інвазійні хвороби представлені збудниками протозойних хвороб – 60 %, моногеноїдози та трематодози – 20 %, цестодози – 10 %, арахноентомози – 7 % та нематодози – 3 %. Також відмічене паразитозисійство.

Ключові слова: *рибництво, аквакультура, водний фонд, біологічні небезпеки, збудники, інфекційні та інвазійні хвороб риби*