ANTHROPOGENIC AND ENVIRONMENTAL FACTORS OF NATURAL REPRODUCTION DECLINE IN BELUGA *HUSO HUSO,* RUSSIAN STURGEON *ACIPENSER GUELDENSTAEDTII* AND STELLATE STURGEON *A. STELLATUS* AT THE VOLGA-CASPIAN REGION

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Basing on own and literature data it was analyzed the influence of environment and anthropogenic factors (long-term fluctuations of the Caspian Sea level, decline of water flow of the Volga River as well as decrease of anadromous sturgeon species migration roots resulting dam construction, water pollution at lower reaches of the Volga River as well as at the Caspian Sea, intensive and selective illegal fishing) on scale of natural reproduction in beluga, Russian sturgeon and stellate sturgeon at Volga-Caspian basin during last 60 years. For separate periods of time were found leading factors of natural reproduction decline in species under study.

Keywords: beluga *Huso huso,* Russian sturgeon *Acipenser gueldenstaedtii,* stellate sturgeon *A. stellatus,* natural reproduction, Volga-Caspian basin.

GENERAL ORGANIZING PRINCIPLES OF A UNIFIED STRATEGY FOR MANAGING CRABS AND KING CRABS FISHERY IN THE SEAS OF RUSSIA

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Russian crab fishery yields around 60 thousand tons annually and is based mainly on the four commercial crab species: Red King crab (= Kamchatka crab; *Paralithodes camtschaticus*), Blue King crab (*Paralithodes platypus*), Opilio Snow crab (*Chionoecetes opilio*) and Baird's Snow crab (= Tanner Snow crab, *Chionoecetes bairdi*). Basing on the monitoring and fishery statistics data, general fishery decision-making rules for implementing the harvesting strategy using the precautionary approach have been elaborated for 31 commercial stocks of the four crabspecies in the Russian Far East Seas and the Barents Sea. Elaboration of the fishery decision-making rules was carried out through common approach that included the analysis of available information and the stock assessment methods, establishing the stock status zones by defining the Limit and Target Reference Points, analysis of population dynamics in previous years and establishing long-term targets and harvest strategy for each given stock. Depending on the population abundance in relation to the Reference Points and dominating trend in population dynamic, the status for each of 31 commercial crab stocks was defined according following six grades: growing stock, stable stock, declining stock, recovering stock, depressive stock, uncertain stock and the virgin stock. The stock status was taken into account for elaboration the decision-making rules and the harvesting strategy for each stock. Unified harvest-control rules for commercial crab stocks are aimed at enhancing long-term sustainability of Russian crab fisheries.

Keywords: commercial crabs and king crabs, stock assessment and forecast, fishery management.

BIOLOGICAL AND HYDROLOGICAL COMPONENTS DESCRIBING THE LONG-TERM CHANGES AND THE CURRENT STATE OF COD *GADUS MORHUA CALLARIAS* IN THE BALTIC SEA (GDANSK BASIN, SUBDIVISION ICES 26)

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This paper is a study of occurring in recent years (1999–2016) changes in cod *Gadus morhua callarias* physiological parameters of two size groups (less than 40 cm and 40–60 cm) in the Gdansk basin of the Baltic Sea (subdivision ICES 26), which are related to food and maturation rates, and, to a certain extent, to an attempt to identify possible causes, factors and interactions that have formed the current environmental uncertainties and risks when assessing abundance, biomass of Eastern Baltic cod and prospects of this fishery type.

Keywords: the Baltic Sea, cod, integrated ecosystem analysis, physiological parameters, abiotic and biotic drivers.

DYNAMICS OF PRODUCTIVITY OF POPULATIONS OF THE BALTIC SEA FISH – BALTIC HERRING *CLUPEA HARENGUS MEMBRAS* AND SPRAT *SPRATTUS SPRATTUS BALTICUS* – IN RELATION TO ENVIRONMENTAL FACTORS AND FISHERY

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Achieved review and long-term dynamics of productivity indicators for Baltic herring *Clupea harengus membras* and sprat *Sprattus sprattus balticus*. We compiled and analyzed data on the number of juveniles, spawning stock biomass and catch in relation to areas of the Gulf of Bothnia and Riga, as well as the central part of the sea. On the basis of the use of correlation and regression methods set features the influence of environmental factors on productivity indicators herring fish in some areas. The role of the fishing impact on the populations of herring and sprat.

Keywords: Baltic sea, herring *Clupea harengus membras*. and sprat *Sprattus sprattus balticus*, factors of the marine environment, the productivity of populations, fishery.

MODERN CONDITION OF THE ICHTHYOFAUNA IN THE SYSTEM OF THE DNIEPER RIVER WITHIN SMOLENSK REGION OF RUSSIA

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Subsequent to the results of the ichthyological monitoring of the Dnieper River within Smolensk Region the species compostion, the structure of the ichthyocenosis and biotopical distributive characteristics of fishes in the upper reach are provided. The abundance and ichtyomass of the fishes in the riverbed zone during the summer period were evaluated. The species composition and the concentration of the larval fish during the downstream migrations in the Upper Dnieper were determined.

Keywords: the Upper Dnieper, Smolensk Region, ichthyological monitoring, fish population, ichthyocenosis structure.

THE EFFECT OF ENVIRONMENTAL INSULATION ON IMMUNOLOGICAL AND PHYSIOLOGICAL PARAMETERS IN BREAM *ABRAMIS BRAMA* AT THE EXAMPLE OF LAKE CHASHNITSKOE AND RYBINSK RESERVOIR

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The features of morphophysiological and immunological parameters of bream populations from the isolated drainless reservoir in comparison with population of fishes from a flowing reservoir were research. The effects of prolonged isolation and adaptation to local conditions of existence the levels of protein in the blood plasma, humoral and cellular innate immunity, hematology and genotoxic parameters were shown. Lower parameters in fish from the lake, compared with fish from the reservoir were marked.

Keywords: bream, *Abramis brama*, total protein, bacteriostatic activity of blood serum, nonspecific immune complexes, blood cells, micronuclei, lake Chashnitskoe, Rybinsk reservoir.

BIOCHEMICAL INDICATORS AS CRITERIA OF PHYSIOLOGICAL STATE OF RED KING CRAB *PARALITHODES CAMTSCHATICUS* (DECAPODA, LITHODIDAE) DURING TRANSPORT

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The stress in red king crab *Paralithodes camtschaticus* associated with catch, storage and live transport often leads to the death of a significant number of individuals. Selective analysis of hemolymph will allow to control of the transport process and to predict survival of crabs more effective. The changes in biochemical parameters of the red king crab's hemolymph during 15 and 30 h transport without water were studied. Increase the concentration of glucose, lactate, uric acid and calcium in crab's hemolymph during prolonged storage in air was established. The dependence was showed between the growth of glucose and uric acid in the crab's hemolymph and transport duration.

Keywords: red king crab, *Paralithodes camtschaticus*, hemolymph, chemical composition, transport, stress, The Barents Sea.

WEIGHT-GAINING RATE OF THE PIKE *ESOX LUCIUS*

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Quantitive analysis of large amount of data about weight growth of the pike in natural water bodies of the Russian Federation was carried out using standard model of weight-gaining rate of fish. Trends and concrete values of parameters of average annual rate of weight gain of the pike during ontogeny were determined. Loss of roe and caviar weight during spawning was also taken into consideration. In the latter case, average annual rate of weight gain demonstrated high degree of constancy during ontogeny, in particular, negligible difference between weight-gaining rate of nobilous and impuberal fish. Specific value 0.01540 was offered as standard value of average annual weight-gaining rate of the pike in natural water bodies. Expert evaluation of productive effect of temperature to the pike

was made. It allows to correlate value of average annual rate of weight gain with genetic coefficient of the pike (0.134) and make predictive calculations of weight-growth of the pike in a vast variety of conditions of its natural habitat.
Keywords: pike, *Esox lucius* L., natural waterbody, natural pond, weight-gaining rate, standard model, standard parameters, ontogeny periods, nobilous, impuberal, juvenile, temperature effect to weight growth.

THE NUMBER OF FISH LARVAE AND DIVERSITY OF FISH SPECIES IN COASTAL ZONE OF SVIYAZHSK AND MESHA BAYS OF KUIBYSHEV RESERVOIR

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The diversity of fish larvae, there spawning periods, number and distribution according to the stages of development considered in littoral zone of Sviyazhsk and Mesha Bays of Kuibyshev reservoir in 2012–2013 years. Determined that in large Bays the highest number of fish larvae observed when the water level increased, such as in 2013. Relatively high species diversity Shannon index was observed at lover values of the index of abundance and evenness of fish species Fluctuations in the total number of fish larvae in different years were similar in nature in both Bays, but in some species due to species due to specifics of breeding there were also differences. For example, the number of bream fish larvae in Mesha Bay during studied years was significantly higher than in the Sviyazhsk Bay.
Keywords: fish larvae, species diversity, number of species, littoral zone, Bay, reservoir.

CHARACTERISTICS OF RECREATIONAL FISHING *HYPOMESUS JAPONICUS* IN CHIKHACHEVA BAY (TATAR STRAIT, KHABAROVSK REGION)

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The article presents data on the current population status *Hypomesus japonicus* in the Tatar Strait. In 2016, compared with 2006 marked decrease amateur catches, which requires further additional studies to identify the causes of decline. Fixed decrease in the proportion of females in the catch, as well as reduced size and weight and nutritional indicators smelt. The maximum size of the smelt in the catch has decreased by almost 15%, reaching 206 mm in 2016 against 235 mm in 2006. In females, in addition to reducing the maximum size decreased weight indicators – almost 25% (in 2016 31.8 g vs. 40.5 g in 2006). nutritional factor for Clark males females *Hypomesus japonicus* in 2016 was also lower than in previous years. Perhaps recorded facts about the deterioration of feeding conditions and reducing fodder. The conclusion about the need for monitoring works on the mind.
Keywords: recreational fishing, fishing, smallmouth smelt, the catch per unit effort.

A FEED OF MUSSEL *MYTILUS TROSSULUS* (BIVALVIA: MYTILIDAE) ON LITTORAL ZONE VESELAYA BAY TAUI GULF THE SEA OF OKHOTSK

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Diet of the Pacific mussel was studied on the littoral of Taui Bay in the spring (June) and summer (August) periods. Occurrence of representatives of phytoplankton, such as *Chaetoceros, Coscinodiscus, Thalassiosira* and others, zooplankton and fragments of macrophyte, sediment dwellers and detritus in gastrointestinal tract are discussed. Seasonal quality and quantity changes in feeding content of mollusks, conditioned by peculiarities of the forage base of Taui Bay, were noted. Allowable load limit of mariculture of mussels in water area of Veselaya Bay was estimated.

Keywords: composition food, mussels, plankton, animal plankton, macrovegetation, food spectrum, littoral zone.

IN MEMORY OF ICHTHYOPATHOLOGIST TATYANA BEZGACHINA (05.05.1954 – 19.12.2016): SHORT SCIENTIFIC BIOGRAPHY

The article describes the scientific path of PhD T.V. Bezgachina - a specialist in commercial aquatic biological resources and aquaculture object diseases, well-known among the Russian and the European fisheries scientific communities. T.V. Bezgachina studied fish ichthyopathology for more than 40 years, working in several Russian fisheries organizations and institutions, including PINRO and VNIRO. In recent years she headed the laboratory of fish diseases in VNIRO and developed methods and medicines diseases prevention and treatment for the hydrobionts. She was a member of the Scientific Council MIK and an expert of the ICES and published more than 160 scientific publications.

Keywords: ichthyopathologist, fish diseases, prevention and treatment of aquatic biological resources and aquaculture objects, scientific path, VNIRO, PINRO.

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