THE DYNAMICS OF POPULATIONS OF BOTTOM-DWELLING FISH PRODUCTIVITY OF THE BALTIC SEA *GADUS MORHUA MORHUA, GADUS MORHUA CALLARIAS, PLEURONECTES FLESUS, PLATESSA PLATESSA* IN RELATION TO ENVIRONMENTAL FACTORS AND FISHING

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Achieved consideration of long-term dynamics of populations of productivity indicators of the main commercial demersal fish Baltic - Eastern Baltic cod *Gadus morhua callaris*, Western Baltic cod *Gadus morhua morhua*, a river *Pleuronectes flesus* and plaice *Platessa platessa*. Compiled and analyzed data on the survival of eggs on the spawning grounds, the number of juveniles, spawning stock biomass and catches for the different areas. On the basis of the use of correlation and regression methods established regional characteristics influence a number of environmental factors on the performance of bottom fish populations. The role of the fishing impact on the population concerned.

Keywords: Baltic cod, river and sea flounder, the number of juveniles, spawning stock biomass, catches factors of the marine environment, fishing mortality.

RESULTS OF PHYSIOLOGICAL AND BIOCHEMICAL MONITORING OF THE REPRODUCTIVE POTENTIAL OF THE ROUND GOBY *NEOGOBIUS MELANOSTOMUS* FROM THE SEA OF AZOV

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The reproductive performance of the round goby males and females has been studied during their spawning season in the Taman, Taganrog and the south-eastern Azov Sea. Disorders in quality of the genital products and reproductive function may be responsible forpoor breeders' fecundity and viability of the progeny, and thus affect the reproduction rate of the round goby population.

Keywords: round goby, hepatosomatic index, gonadosomatic index, fecundity, oocyte resorption, carotenoids.

BIOLOGY OF THE INCONNU *STENODUS LEUCICHTHYS NELMA* (COREGONIDAE) MIDDLE REACHES OF THE KOLYMA RIVER WITHIN THE MAGADAN REGION

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The article first presented research materials of the inconnu middle reaches of the Kolyma River (Magadan Region). In this article the author analyzes morphological features, distribution, nutrition, puberty, reproduction, population structure and size and age composition of the inconnu middle reaches of the Kolyma River. Also the growing equation, the natural mortality coefficient and population characteristics were calculated.

Keywords: inconnu *Stenodus leucichthys nelma*, Kolyma's basin, morphology, nutrition, puberty, fecundity, reproduction, population structure, age, growth, natural mortality.

ON THE QUESTION OF THE GENETIC EVIDENCE OF THE TAXONOMIC STATUS OF THE WHITE SEA COD (GADIDAE)

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A comparative analysis of the variability of eight microsatellite loci in the White Sea cod is compared with the Greenland, Pacific and Atlantic cod. Based on the results of a pairwise evaluation of genetic differentiation performed on the examined microsatellite loci on the basis of the values of θ (FST analogue), the sample of the White Sea cod differed significantly of the Greenland cod, the Pacific cod and the Atlantic cod, but the level of differentiation was different: the lowest value is shown with respect to Atlantic cod. This shows in favor of the taxonomic status of the White Sea cod as a subspecies of Atlantic cod.

Keywords: White Sea cod *Gadus morhua marisalbi*, microsatellite loci, taxonomic status, the White Sea.

ANTARCTIC KRILL *EUPHAUSIA SUPERBA* FISHERY TACTICS USING THE CONVENTIONAL TECHNIQUE AND THE CONTINUOUS PUMPING SYSTEM

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This paper presents the analysis of Antarctic krill fishery tactics and efficiency using the conventional technique and the continuous pumping system onboard the *Maxim Starostin* and the *In Sung Ho* operated in the South Orkney Island region (Subarea 48.2) during the fishing seasons 2008–2009, 2009–2010 and 2010–2011. The analysis revealed advantages and disadvantages of each fishing technique related to fishing efficiency and quality of raw krill caught. The Continuous pumping system was more effective in a favorable fishing situation (dense and stable krill swarms), providing a processing line with a high quality raw krill. The Conventional fishing technique showed comparatively high efficiency of searching operations during unstable fishing situation, despite strong damages of krill in case of high catches. The combined krill fishery, using the Conventional fishing technique and the Continuous pumping system with possibility of rapid change of fishing gears, was recommended for increasing of fishing efficiency.

Keywords: Antarctic krill, *Euphausia superba*, fishing tactics, Conventional fishing technique, Continuous pumping system.

LONG-TERM OPTIMIZATION SOLUTIONS MODELLING FOR THE RUSSIAN FAR EAST FISHERY PROCESSING ENTERPRICES CLUSTER (EXAMPLE OF CATCHING AND PROCESSING FOR MACKEREL AND IWASHI-SARDINE FISHERY)

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Main results of the common linear programming and system dynamic models in the field of analyzing investment projects methods are proposed in presented paper. Different scenario for types of mackerel and iwashi-sardine catching and processing management are investigated below.

INTERNATIONAL REGULATION OF CONSERVATION OF THE EUROPEAN EEL *ANGUILLA ANGUILLA* STOCKS IN BALTIC SEA: ISSUES AND PROSPECTS

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Some issues of European eel stocks conservation and recovery are analyzed in this article. The circumstances preventing the implementation of Russian activities aimed on stock recovery of European eel was examined. International legal acts on trade in endangered species of wild fauna and flora are considered in this regard. Possible consequences of Russian inactivity in relation to recovery of transboundary eel stocks are defined. Some proposals for national interest promotion are suggested.

TO THE CHOICE OF MATHEMATICAL MODEL OF RIVER BEACH SEINEFISHING

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This article provides a brief analysis of the existing mathematical models of river beach seine catch of fish, given their limitations. The necessity of optimization of the most important parameters of fishing: fishing time and noticed the shape of the seine. A new mathematical model avoids the disadvantages of previous and allows to efficiently manageriver beach seine fishing.

NEW METHOD OF SCHOOLMASTER SQUID *BERRYTEUTHIS MAGISTER* BIOMASS ASSESSMENT

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A new method of biomass assessment of schoolmaster squid *Berryteuthis magister*, based on a modern view on the role of the North Kuril Islands area in functional structure of its range presented. Squid biomass in this area consists of two components – the biomass in aggregations and rarefied, «background» biomass. Correlation of the biomass of squid in aggregations with catch per unit

effort of commercial fleet determined on the base of surveys data and commercial statistics analysis. «Background biomass» assessed using the data of squid density outside aggregations, squid distribution area and squid biomass refresh rate in the area. Examples of biomass estimation of squid migrated through the North Kuril fishery zone in 2012 and 2015 presented.

ASSESSMENT OF THE VOLGA STOCK OF STELLATE STURGEON *ACIPENSER STELLATUS* IN THE CASPIAN SEA DURING THE MORATORIUM ON FISHING: RETROSPECTIVE VIEW AND POSSIBLE FUTURE SCENARIOS

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The significant volumes of illegal catches and decline in natural spawning area, together with the poor hydrological conditions have brought about a considerable drop in the Volga stock of stellate sturgeon. The commercial fishing for the species was closed from 2005; only a very small catch volume is permitted now for scientific monitoring and for stock enhancement purposes. The interrupted time series of data do not make it possible to apply the conventional stock assessment techniques. An attempt is made in this paper to compute the dynamics of this stock using DB-SRA method which is normally used in respect of the stocks for which only scarce data are available. The input information includes a retrospective catch data series (sum of legal and illegal catches), and four input parameters provided with the probability distribution. This method enabled us to evaluate the dynamics of the Volga stellate sturgeon stock biomass, and set a number of management reference points. Besides, some prediction is made a regards this stock's potential fluctuations under various harvesting alternatives. It is shown that given the present illegal catch level this stock would disappear by the year 2027. However, if illegal fishing is fully terminated , and under the current juvenile release volumes from the Volga hatcheries during 50 years, the stock might recover up to 60% of the optimum level ensuring the maximum sustainable yield. In order to ensure rehabilitation of the stock to the optimum level after 50 years the illegal fishing must be fully stopped, while releasing the young fish annually in the amount of 10 million individuals.

ON USING OF DYNAMICS PRODUCTION MODELS (THE APPLICATION PROGRAMM COMBI 3.0) FOR RECOMMENDED VOLUMES OF CATCHES OF AZOV ANCHOVY AND GOBIES JUSTIFICATION

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Based on materials of fishery statistics and monitoring of fisheries by YugNIRO and AzNIIRH in 2000–2014, the of catch per unit of fishing effort and fishing effort for the Russian and Ukrainian of Azov anchovy *Engraulis encrasicolus maeoticus* purse seines and pelagic trawls fishing and Azov gobies the Gobiidae Family dredges fishing were estimated. These estimates are used to justify and calculate the recommended catch on the basis of an application COMBI 3.0,

presented of VNIRO at the Sectoral methodological Seminar on the study of modern methods of stock assessments and the rational use of water biological resources (Sochi, October 2015). Peculiarities of working with the program in terms of decision-making regarding the choice of the best variant calculations are described. The prospects of the dynamic production models in relation to short-cycle commercial fishes of the Azov-Black Sea basin fisheries are showed.

FISHERY RETURN OF HERRING-BLACK-BACKED SHAD *ALOSA KESSLERI KESSLERI* IN THE VOLGA RIVER IN 2010–2014

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The work presents the results of observations to the spawning migration of spawners of herring-black-backed shad in the Delta of the Volga River in 2010–2014. The article gives the assessment of the effectiveness of spawning of this species. It is estimated the quantity of spawners of the species at age 3 and 4 years old from the spawning stock and it is carried out a comparison with fishery stock. Thus, the most authentic estimations are obtained from species of 4 years old, because not all individuals of 3 years old g to the spawning. According to the obtained data it is estimated the coefficient of the entry into the fishery of individuals from 3 to 4 years old. According to the number of generations it is estimated the coefficient of the fishery return on the equation of regression. The calculations have shown that the coefficient of the fishery return is higher with a small (in number) generation. The analysis of a spawning stock of the herring-black-backed shad for 5 yeas (2010–2014) evidences about the fact, that the coefficient of the fishery return 0,02, used in estimations of number of the species to the feature, is not justified. The calculations of the coefficient values of the entry into the fishery of individuals of 3 and 4 yeas old, make up 60% of the spawning stock, have shown that in comparison with the previously accepted values they are reduced in 2,5–3,6 times.