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AQUACULTURE DEVELOPMENT IN PRIMORYE: REALITIES AND OPPORTUNITIES

© 2015 y. L. N. Bocharov, S. E. Pozdnyakov, G. S. Gavrilova, G. N. Kurgansky, E. I. Rachek

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Outcome of aquaculture development are analyzed for more than 40 year period in Primorye. The achieved level of scientific support, as well as possibility for increasing aquaculture production is reviewed in the region. Successful development of this industry depends on the decision of the complex problems, including advanced development research and improve management. Some tools of the ecosystem approach have been used for the analysis of aquaculture management problems.

Keywords: Primorye, aquaculture, salmon culture, freshwater fishing, invertebrates, cultivation technology.

TO THE CHARACTERISTICS OF THE RARE SPECIES OF FISH FAUNA OF THE YENISEI RIVER

© 2015 y. V. A. Zadelenov

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The fish fauna of Yenisei River basin has undergone significant changes due to anthropogenic impacts in recent decades. Overregulated river water flow as a result of hydro construction was the most significant factor. Just had a strong negative impact penetration into waters of alien species, pollution and wasteful catch fish.

Keywords: Siberian sturgeon, sterlet, taimen, lenok, inconnu, round whitefish, siberian whitefish, humpback whitefish, broad whitefish.

POACHING IMPACT ASSESSMENT ON SMALL SALMON RIVERS (KAMCHATKA)

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Poaching impact assessment on population level is provided for two small salmon rivers. Assessment refers both for the period before road construction and after road construction that made available access to previously hardly accessible remote locations. The overall length of unauthorized access roads (including unsurfaced roads, turnoffs, and pass ways) within the River Kol has been increased thrice during the last 10–15 years. This is resulted in 4–8 times reduction of spawning significance of the Tolmacheva River for the salmon enhancement.

Keywords: poaching, salmons, Kamchatka.

STUDY OF THE BARENTS SEA ICELAND SCALLOP *CHLAMYS ISLANDICA* STOCK DYNAMICS USING THE ANALYTICAL MODEL

© 2015 y. S. V. Bakanev, P. N. Zolotarev

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Scallop abundance dynamics in the fishery concentration of the Svyatoy Nos Cape in 1991– 2012 was studied. It was found that the scallop stock abruptly reduced in that period due to high direct and indirect fishing mortality against low recruitment. Modelling of the scallop stock dynamics using the Bayesian

approach showed that, at present, the aggregation productivity is quite low as a result of which the stock will not be able to recover to the initial level in the nearest 10–20 years even if there is no fishery here.
Keywords: Iceland scallop, the Barents Sea, abundance dynamics, modelling, Bayesian method.

RESEARCHES OF THE RED SNOW CRAB *CHIONOECETES JAPONICUS* (DECAPODA, MAJIDAE) IN THE SEA OF JAPAN. 2. THE LOCAL POPULATION ON THE KITA-YAMATA BANK IN 20 YEARS AFTER FISHERIES TERMINATION

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The data of the trap surveys made in 1992–93 during fisheries and in 2012 during scientific researches let compare the density indexes (crabs per trap) and size structure of the red snow crab local population on the Bank Kita-Yamato. It is found that for 20 years of fisheries absence the density index increased due to males with carapace width more than 85 mm. Catches of females increased in all size classes. The average size of 0,5% of the largest males increased from 128 mm in 1992–93 to 132 mm in 2012. Now the fisheries on the Kita- Yamata Bank may be resumed.
Keywords: *Chionoecetes japonicus*, density index, trap soak, Sea of Japan, Kita-Yamata Bank.

MOLTING PROCESSES AND DYNAMICS OF SIZE AND WEIGHT IN THE LARVAE OF KING CRAB *PARALITHODES CAMTSCHATICUS* (DECAPODA, LITHODIDAE)

© 2015 y. R. R. Borisov, D. S. Pechyonkin, N. V. Kryakhova, N. P. Kovacheva

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Molting cycle and the dynamics of size and weight of all larval stages (zoea I-IV) of the red king crab *Paralithodes camtschaticus* were studied. Premolt stage (D) dominates in molting cycle and accounts for over 60% of the time. Dynamics of indicators of dry mass were characterized by equable growth between molts. Dry weight of the individual decreased after molting. Dry exuvial weight was from 20 to 30% of dry individual weight. Molting processes need to be considered with assessing of the growth rate in the larval period.
Keywords: red king crab, *Paralithodes camtschaticus*, moulting, growth, larvae.

ASSESSMENT OF INFLUENCE OF THE CUT-OFF ON THE FISH POPULATION OF THE SMALL RIVERS OF MESHCHERA LOWLAND (RYAZAN REGION)

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The analysis of the fish population in the small rivers which have undergone a rectification works is carried out. It is noted that in the rivers with the straightened course there is a reduction of species richness and a species diversity of fishes through destruction of various biotopes – rifts, reaches, deeps, inlets etc. Increases a share of fish rheophil complex at cut-off do not occur. The main land-reclamation drain in some cases also as well as the small rivers can have high species richness and a species diversity of fishes.
Keywords: fish population, small rivers, cut-off, species richness, a species diversity.

PARAMETERS OF GROWTH AND FECUNDITY OF ARCTIC GRAYLING *THYMALLUS ARCTICUS* (PALLAS, 1776) IN THE MIDDLE REACH OF THE YENISEI RIVER

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The growth and fecundity of Arctic grayling was investigated. Graylings were captured in the middle Yenisei river drainage in 2010, 2011, and 2013 years. It was demonstrated that grayling's grows rate in this area is higher than in the Yenisei river tributaries and in its main channel in period of time before construction of the Krasnoyarsk hydropower station. Was obtained the coefficients of equations linking weight and body length; calculated the constants of Bertalanffy growth equation: $L\infty = 395{,}4 \pm 66{,}3$; $K = 0{,}34 \pm 0{,}17$. Individual absolute fecundity in average was 3370 ± 290 units, relative – $16{,}0 \pm 1{,}3$ thousand units/kg. Suggested sample value of mature Siberian grayling of the middle Yenisei river drainage – 250 g.

Keywords: grayling, *Thymallus arcticus*, Yenisei river, growth, Bertalanffy growth equation, fecundity.

STOCK STATUS AND POTENTIAL OF DEEP-SEA SHRIMP FISHERY IN THE PRIMORYE AREA

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Distribution, current stocks status and biology of the northern shrimp (*Pandalus borealis*) and comb shrimp (*P. hypsinotus*) in Primorye subarea south of 47º 20'N is presented potential for these species fishery in Primorye is discussed. Basing on the trawl survey data the stock of the northern shrimp has been estimated at 34.0 thousand tons, including 7.84 thousand tones concentrated on the slope fo the Peter the Great Bay and in the Bay itself. For the comb shrimp these estimates are 10.005 thousand tons and 4.3 thousand tons, correspondingly. Recent researches indicate to the successful recovery of both northern and comb shrimps in the Peter the Great Bay and its slope area, which allows to lift the ban on shrimp fishery in 2014 in the Primorye area with TAC for the northern shrimp 3,4 thousand tons and for the comb shrimp – 1.005 thousan tons. Data on distribution and stock of these shrimps obtained during research surveys were verified and confirmed by subsequent fishery using shrimp – pots and trawls. Given the size of the shrimp, their current stock and distribution, potential of the deep-sea shrimp fishery in the Primorye area could be described as rather promising.

Keywords: northern shrimp, humpback (coonstripe) shrimp, commercial stock, total allowable catch, demersal trawl, shrimp pot, Peter the Great Bay, Sea of Japan.

DYNAMICS OF FAR-EASTERN DACE *TRIBOLODON BRANDTII* IN THE AMUR BAY (PETER THE GREAT BAY, JAPAN SEA)

© 2015 y. A. N. Vdovin, Yu. I. Zuenko, S. F. Solomatov, S. G. Bolshakov

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Stock of Far-Eastern dace in the Amur Bay changed since 1991 in wide range 1.5–11.0.103 t, with two periods of high stock in the 1991–1994 and in 2007–2012. Its year-class strength depends on discharge of the Razdolnaya/Suyfen

River that flows into the Bay, but only for the years with high spawning stock: strong year classes are formed in the years with abundant precipitations in winter that cause strong river discharge in spawning season of the dace (spring) but never in the years with low winter precipitations, in spite of high spawning stock. However, this relationship is not found for the years with low spawning stock.
Keywords: Far-Eastern dace, *Tribolodon brandtii*, Amur Bay, Japan Sea, stock dynamics, year-class strength, spawning stock, river discharge.

LYSOZYME OF CYPRINIDAE IN DIFFERENT CLIMATIC ZONES

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Cyprinids are characterized by low and vary low content of lysozyme in the liver, kidney, spleen, and often by its absence in the serum. The seasonal dynamics of lysozyme in the serum does not reflect the full variability of the enzyme in the fish organism. The lysozyme level in cyprinids is not determined by temperature conditions of constant habitats in water bodies of temperate latitudes or tropics. According to the results of research carps species in various climatic zones are more similar in the lysozyme level when compared to numerous specimens of *Cyprinus carpio* or *Labeo rohita* in different experimental conditions.
Keywords: Cyprinidae, lysozyme, liver, kidney, spleen, serum, temperature.

THE STATE OF A FRESHWATER ECOSYSTEM UNDER COMMERCIAL CULTIVATION OF RAINBOW TROUT IN LAKE VERCHNEE PULONGSKOE (NORTH KARELIA)

© 2015 y. O. P. Sterligova, N. V. Ilmast, Ya. A. Kuchko, E. S. Savosin

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Research results of hydrochemical, hydrobiological regimes, fish populations and calculating phosphorus and nitrogen loads in Lake Verchnee Pulongskoe after five years of operation trout complex presented. Environmental assessment of trout production volumes in the water body conducted. Analysis of the data showed that the aquatic ecosystem is within the natural variation of quantitative parameters for zooplankton and benthos. It is shown that acceptable cultivation of trout in the water body is in the volume 600 tons per year.
Keywords: water ecosystem, trout cultivation, biogenic load, environmental assessment.

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AQUACULTURE AND ARTIFICIAL REPRODUCTION

MODERN STATE OF THE FISH AND CYCLOSTOMES FAUNA IN WATERBODIES OF VOLOGDA REGION

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Overview of modern fish and cyclostomes fauna inhabiting waterbodies of Vologda region was described in the article. Location of the region in the watershed of the largest drainage basins of Eurasia has a decisive influence on the composition of the fish fauna. Differences in the distribution of different species of fish and cyclostomes freshwater waterbodies in basins of the White, Baltic and Caspian Seas were researched. Faunal differences of water ecosystems belonging to different basins on the territory of Vologda region are reduced due too resettlement of many fish species.

Keywords: fish fauna, basins of White, Caspian and Baltic Seas, fish and cyclostomes, Vologda region.

ESTIMATION OF YIELD-TO-FISHERY COEFFICIENT OF THE CASPIAN SEA SPINY STURGEON *ACIPENSER NUDIVENTRIS* FROM FINGERLINGS OF ARTIFICIAL REPRODUCTION

© 2015 y. L. A. Zykov, A. B. Kazanskiy*, M. I. Abramenko**

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Estimation of yield-to-fishery coefficient of Caspian Sea spiny sturgeon from fingerlings, released at artificial reproduction is given, based on the model of mean generation abundance and biomass dynamics, accounting for maturation rate, spawning periodicity, age-specific natural mortality and fishing effort. The role of artificial reproduction in the formation of ship population in the period of 1970–1980-s is estimated as well. Recommendations concerning restoration and management of ship stocks are proposed.

Keywords: Caspian Sea spiny sturgeon, artificial reproduction, number, biomass, population, yield-to-fishery coefficient.

CONDITION OF FISH RESOURCE AND FISHERY CHUM OF MAINLAND COAST OF THE OKHOTSK SEA

© 2015 y. S. L. Marchenko, V. V. Volobuev, M. V. Volobuev

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Reviewed the main periods of the Okhotsk sea chum quantity in dynamic research due to climatic and anthropogenic factors. The most important among them are two peaks connected with the total increasing of salmon biomass in the Northern Pacific in 1930s and in 1990s of XX century. Shown the changing of the main biological characteristics of chum connected with the quantity level of its approach. Estimated the divisible factors of chum natural reproduction from 4 (four) main stocks – Gizshiga, Yamsk, Tayisk and Okhotsk. It is shown that ratio of reproduction depends on the number of parent stocks, and coefficients of this factor for generations of different numbers are given.

Keywords: chum, fishery, approach, catching, fishing area, biomass.

DISTRIBUTION AND STATUS OF THE RED KING CRAB STOCK IN THE RUSSIAN TERRITORIAL WATERS OF THE BARENTS SEA

© 2015 y. A. V. Stesko

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Distribution of the red king crab in the Russian territorial waters of the Barents Sea is limited by bottom temperature and hydrology regime of waters. During the summer period 2008– 2013 in the coastal Murman dominated female, juvenile and pre-recruits of red king crab. Trend to an increase in average catches and modal carapace width of the red king crab was observed in 2013. Increase in the proportion of injured crabs from the eastern to the western areas may be caused by increase in the density of clusters and the intensification of illegal fishing.

*Keywords***:** The Barents Sea, territorial waters, red king crab, distribution, catches, size composition, stock, abundance, injury rate.

MOLTING CYCLE OF DEEP SNOW CRAB *CHIONOECETES ANGULATUS* IN THE EASTERN SAKHALIN WATERS

© 2015 y. E. R. Perveeva

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Dynamics of the triangle snow crab (*Chionoecetes angulatus*) catches composition at East Sakhalin for 2000–2012 examined. Proportions for the different molt cycle stages in seasonal aspect are analyzed. The peak malt season from July-August to October-November for the triangle snow crab at East Sakhalin established. The malt period of triangle snow crab males may be shifted for about a month interannually. Additional period of malt intensity arise after the main malt period was registered for some years.

Keywords: Chionoecetes angulatus, Eastern Sakhalin, molt cycle, crab fishing efficiency.

RESEARCHES OF THE RED SNOW CRAB *CHIONOECETES JAPONICUS* (DECAPODA, MAJIDAE) IN THE SEA OF JAPAN. 3. FISHERIES STATE AND PERSPECTIVES

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Data on the red snow crab *Chionoecetes japonicus* fisheries dynamics in Russia, Japan and Korea are given. Fisheries in Japan began in 1967 whilst in Russia and Korea it started in 1990-ths. Maximal yield in Japan was registered in 1984 (53,5 thousands tonnes), in Korea – in 1997 (38, 9). Russian fisheries in 1992–1997 was carried out by 2–9 ships with scientific observers on each vessel. The fisheries effort sharply increased from 1998 and the maximal yield (10,3 thousands tonnes) was registerd in 2003. From 2004 to 2006 the catches decreased, and then 15–20 vessels began to catch 2–3 thousands tonnes per year. Only 40–60% of the total allowed catches were used in 2006–2013. Both spatial and temporal distribution of the effort and the effect of type of production on fisheries are analysed. The problem of overfishing in 2000-ths is discussed.

Keywords: *Chionoecetes japonicus*, the Sea of Japan, fisheries, yield, effort, spatial distribution.

FISH PREDATION OF SNOW CRAB *CHIONOECETES OPILIO* AND SHRIMP *SCLEROCRANGON SALEBROSA* IN PETER THE GREAT BAY (SEA OF JAPAN) DURING SUMMER PERIOD

© 2015 y. A. N. Vdovin, O. I. Pushchina, E. N. Drobyazin, P. A. Fedotov

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The size of seasonal consumption of snow crab *Chionoecetes opilio* and shrimp *Sclerocrangon salebrosa* by fishes in Peter the Great Bay is significantly higher than the estimations of abundance of these species calculated by survey data was shown. The degree of underestimating of crustaceans increases with decreasing size. The possibility of correction of hydrobionts stocks values obtained by direct surveys was discussed.

Keywords: snow crab, shrimp, consumption, stock estimation, Peter the Great Bay.

PROBLEM DEFINITION AND INCREASE CATCHABILITY COEFFICIENT RIVER BEACH SEINE IN DELTA RIVER VOLGA

©2015 y. V. N. Churunov, E. P. Novozhilov*, D. A. Kostrykin*

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In an article in chronological order shows how the definitions and methods of calculating the coefficients of catchability river beachseine different researchers since the beginning of the XX century to the present. Proposed: a method of determining an analytical expression for calculating the coefficient of catchability.

Keywords: river beach seine, coefficient of catchability, coverage of the seine, the probability of fishing, intensity running fish.

THE INVESTIGATION MECHANICAL A DIPPINF OF THE VERTICAL LONGLINES

© 2015 y. L. A. Gabryuk

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Is Worded statement of the problem «of the dipping of the vertical hook longlines». The deliver problem is solved with use the system speaker theorems of the variable mass. Designed software on the base of the Program ambience MathCad-14 for calculation of the vertical hook longlines on three stages he of the dipping. At modeling is used the Mainline, presenting tightrope with evenly portioned hooks, hook and bait. The Problem dares with provision for joined masses deep-water buoy. The Decision of the system of the source differential equations is received by means of the numerical methods. The Executed analysis to dependencies of time (velocity) of the dipping from type the dipping Mainline with provision for dependencies factor hydra dynamic of power from number Reynolds. The Installed influence of power inertia on shaping the picture of the motion. Got analytical data correlation with experimental studies.

Keywords: vertical hook longlines, mainline, deep-water buoy, dipping, joined masses.

GILLNET SELECTIVITY MODEL CONSIDERED FISH GILLED AND ENTANGLED

© 2015 y. F. S. Lobyrev, E. A. Kriksunov, A. E. Bobyrev*, V. A. Byrmensky

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The method worked out is based on a physical description of catch that produces proportions of fish that are gilled and entangled. The approach is applicable for assessing the number of fish that contact gillnets. Model parameters are estimated from catch-lenght analysis, mesh measurements, and fish morphometry

Keywords: gillnet selectivity, model, size group frequency, gilled, entangled fish.

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AQUACULTURE AND ARTIFICIAL REPRODUCTION

POPULATUION DYNAMICS IN THE BELUGA, RUSSIAN STURGEON AND STELLATE STURGEON UNDER CONDITIONS OF COMMERCIAL FISHING BAN IN THE VOLGA-CASPIAN BASIN

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The data on stock abundance, structure of spawning part of populations and reproduction in beluga *Acipenser huso*, Russian sturgeon *A. gueldenstaedtii* and stellate sturgeon *A. stellatus* from the Volga-Caspian basin while ban of commercial fishing were studied. It was demonstrated that during the period of ban stock abundance and some biological characteristics of spawners migrating to the Volga River for reproduction decteased as well as ratio of females. It was resulted by illegal fishing which scale is close to legal catch before ban of commercial fishing. Natural reproduction (up to complete stopping in beluga) and controlled reproduction at hatcheries of the Volga River sturgeon decreased.
Keywords: beluga, Russian sturgeon, stellate sturgeon, abundance, stock abundance, natural and controlled reproduction, illegal catch.

FISHERY RESOURCES IN THE BALTIC SEA AND ITS LAGOONS

© 2015 y. I. V. Karpushevskiy, T. A. Golubkova, A. G. Arkhipov
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The Baltic Sea and its lagoons are the traditional areas of the Russian fishery. The base of the domestic raw materials of the sea is formed by such species as cod *Gadus morhua callarias*, Baltic herring (herring) *Clupea harengus membras*, sprat *Sprattus sprattus balticus* and flounder *Platichthys flesus*; bream *Abramis brama*, pike-perch *Sander lucioperca*, roach

Rutilus rutilus, rasorfish *Pelecus cultratus* and perch *Perca fluviatilis* form the raw material base of the lagoons. Fishing for aquatic biological resources is conducted taking into account the intergovernmental agreements between Russia and the riparian countries. The paper presents the fisheries analysis, stock assessment and discusses the development prospects of the domestic fishery in these aquatic areas.
Keywords: the Baltic Sea, the Curonian and Vistula (Kaliningrad) Lagoons, fish stock assessment, fisheries results.

THYROID HORMONES IN WATER ECOSYSTEM S

© 2015 y. N. E. Boiko, S. I. Dudkin
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Thyroid hormones are among the regulatory molecules involved in chemical interaction between organisms of different taxonomic groups. In the water media they are passed through food chains and can adjust organisms' development processes and life strategy, fish including. Thyroid status affects the development and the definitive state of morphological characters in hydrobionts. The participation of thyroid hormones in the formation of fish ecological groups is discussed.
Keywords: thyroid hormones, water media, distribution, ecological interactions.

LARVAL REARING OF INCONNU *STENODUS LEUCICHTHYS NELMA* (SALMONIFORMES: COREGONIDAE) ON THE LIVE AND ARTIFICAL FEED

© 2015 y. A. A. Lyutikov
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The influence of different artificial and natural (*Artemia nauplii*) feed, and their combination, on growth, survival and physiological state of the inconnu *Stenodus leucichthys nelma* larvae. In the diet of *Artemia nauplii* during the first 10 days of cultivation accelerates the growth rate of young fish in the 2.0–2.5-fold compared with the larvae, who received only artificial feed. In the future, the growth rate inconnu on *Artemia* and artificial feeds aligned, which is probably associated with the development of the digestive system of larvae and higher water temperatures, providing a fuller cleavage and digestion of feed components, especially artificial. The best biological indicators of juvenile fish were obtained by feeding with *Artemia nauplii* first days in combination with artificial diet. This approach allows the mutual compensation of each of the feed missing elements provides early schooling to dry food and makes it possible to more successful further transfer of juveniles only on artificial feed.
Keywords: larvae, inconnu, *Stenodus leucichthys nelma*, feeding, *Artemia nauplii*, artificial feed.

BIOLOGY, STOCK ASSESSMENT AND POTENTIAL FISHERY OF *LYCODES SOLDATOVI* (PERCIFORMES: ZOARCIDAE) IN THE SEA OF OKHOTSK

© 2015 y. O. Z. Badaev
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Despite the high number abundance of *Lycodes soldatovi* in the Okhotsk Sea, there are no data on the status of its stock, which are essential for efficient use of its resources. The paper presents some biological characteristics necessary to assess stock status and fishing potential of this species. Biomass of *Lycodes soldatovi* is 92.97 thousand tons, the abundance – 353.64 million. pcs., Fishery – 47.73 thousand. T. The value of the fishing potential is 6.35 thousand tons.
Keywords: *Lycodes soldatovi*, Okhotsk Sea, biomass, abundance, stock, potentional fishing mortality.

MORPHOLOGICAL CHANGES IN CARP-BREAM *ABRAMIS BRAMA*

OF THE SARATOV RESERVOIR

© 2015 y. A. K. Mineev

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The materials of years of research (1995–2011). External morphological disorders, diseases of internal organs and tissues, variations in some hematological parameters in carp-bream (*Abramis brama* Linnaeus, 1758) – one of the most common fish species Saratov Reservoir. Shows a direct correlation of the detected malformations and abnormalities in carp-bream of different age groups (from the early larval stages to adult animals) on the level of human influence on the ecosystem of the studied reservoir.

Keywords: carp-bream, morphological abnormalities, diseases of blood cells, hematological parameters, pathology of the internal organs.

AGE AND SEX DYNAMICS OF WALLEYE POLLOCK
THERAGRA CHALCOGRAMMA **IN PRIMORIE WATERS (SEA OF JAPAN)**

© 2015 y. A. N. Vdovin, V. A. Nuzhdin, M. I. Boiko

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It is shown that in the waters of Primorye sex ratio is expressed pollock age dynamics. Males prevail in the first three age groups. In the age of mass sexual maturation (3+) sex ratio becomes close to 1: 1 after which the proportion of males begins to decline sharply. The last three age groups (9+ –11+) represented only by females. In the general in population, it is 1.4: 1 in favor of males. In adult fishes males more than females by 2.9 times due to earlier maturation of males.

Keywords: pollock *Theragra chalcogramma*, sex ratio, sexual maturation, spawning, Sea of Japan.

DYNAMICS OF STRENGTH OF MATURE EGGS ENVELOPES OF OB-IRTYSH BASIN WHITEFISH (COREGONIDAE) AFTER EXPOSURE TO WATER

© 2015 y. N. V. Smeshlivaya, S. M. Semenchenko

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The paper contains data on the dynamics of strength of eggs envelopes of six species of whitefish after exposure to water. The load value causing rupture of eggs envelopes was used as an indicator of strength. Significant interspecific differences appear in values of the indicator reflecting the strength of eggs envelopes and the duration of each of the selected periods. Results of the experiment show that the nature of changes in the strength of eggs envelopes of the species in question is analogous. It is possible to distinguish four periods in this process: initial increase in strength, decrease in strength, secondary increase in strength, and stabilization of strength of eggs envelopes. After contact of an inactivated mature egg with water, all species under the study showed minor but reliable increase in the strength of eggs envelopes for a short period of time. The time of the minimum strength of eggs envelopes coincides with the end of hydration eggs. Further development of the eggs is accompanied by a secondary increase in strength of eggs envelopes, followed by stabilization at maximum values in a day eggs after activation with water.

Keywords: whitefish; egg; envelopes of egg; hydration; strength of envelopes, the activation of water.

APPLICATION OF SIMULATION FOR EVALUATING THE TOTAL ALLOWABLE CATCH

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It is offered to use computer simulation models of fish populations in the evaluation of the total

allowable catch (TAC). It is shown that the existing methods for calculating TAC implicitly use the concept of commercial fish population model. We establish a connection between the assessment procedure of the TAC and theory of optimum governance of complex systems. Considered experience of application of models with the rustling parameters, applications of the mathematical theory of games, theories of dual management, and also methods of artificial intelligence in relation to a problem of an assessment the TAC.
Keywords: Total allowable catch, simulation model, fish population, optimal management.

ACCUMULATION OF PESTICIDES IN THE LIVER OF SOME COMMERCIAL FISH SPECIES of the Azov Sea in MODERN PERIOD

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An assessment has been made on the accumulation of some contemporary pesticides in the liver of such commercial fish species of the Azov Sea as round goby, haarder, pike perch and roach in 2008–2012. The pesticide concentrations found in the fish appeared to be greater in spring than in autumn. Hematological indices of the fish do not show pronounced physiological changes at the background of those pesticide concentrations that have been revealed in the fish.
Keywords: pesticides, maximum permissible concentration, high-performance liquid chromatography, active ingredients, pesticide pollution, azov sea, round goby, haarder, pike perch, roach, hematology.

BRIEF REPORT ON HISTORY AND CURRENT FISHERY OF COMMON DAB *LIMANDA LIMANDA* IN BARENTS SEA

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A history and current state of common dab fishery in different states since the beginning of the XXth century are presented in the paper. Real catch of common dab in the Barents Sea was calculated by the data on by-catch in bottom fishery in 1990–2013.
Keywords: demersal fish, common dab, history of fishery, catch, Barents Sea.

SCALLOPS (*CHLAMYS*) IN THE KHARIMKOTAN ISLAND SHELF

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The data on the size structure and distribution of scallops in commercial catches in the Kharimkotan Island region during summer 2014 are presented. Two species of scallops were presented in catches: *C. albida* and *C. stratega*. *C. albida* was dominated in catches (99%) with average size 63,3 mm. Maximal catches were registered at the 125 m depth. The biomass of scallops in the Kharimkotan Island region was estimated from the fishery data to be 2,86 thousands tones. This estimation allows increasing of the total allowed catch of scallops in the Northern Kuril Islands on 170 tones.
Keywords: scallops, light scallop, stock assessment, Kharimkotan island.