**Bulletin 63**

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| УДК 664.7.004.8:(664.953:595.384.12) DOI: 10.17217/2079-0333-2023-63-6-21  **THE EFFECTS OF GRAPE SEED FLOUR ON THE QUALITY OF SHRIMP PATE  WITH THE ADDITION OF HERBAL INGREDIENTS FOR THE NUTRITION  OF THE ELDERLY**  Barabashina S.I., Glukharev A.Yu, Dubrovin S.Y.  Murmansk State Technical University, Murmansk, Sportivnaya Str. 13.  In this work, the influence of various concentrations (from 2 to 10% of the total mass) of grape seed flour (GSF) on the quality characteristics of shrimp pate with the addition of herbal ingredients for the nutrition of the elderly was studied in order to establish its acceptable amount in the recipe. The results showed that introduction of GSF in the product, the content of protein, fat, carbohydrates and ash increased, acidity increased, and the moisture content decreased, changed the color of the product from light yellow to dark brown, increases the penetration force and the hardness, viscosity, adhesiveness, gumminess and chewiness and reduces cohesiveness. The organoleptic evaluation showed that the addition of GSF in an amount of 5% of the total mass and above reduces the quality level of the product. The practical possibility of using GSF in the recipe of pate in an amount of less than 5% of the total mass for the preparation of a product with increased nutritional value and with the preservation of its consumer characteristics has been established.  **Key words:** nutrition for the elderly, grape seed flour, pate. |
| УДК 504.5:582.252"2020"(265.52) DOI: 10.17217/2079-0333-2023-63-22-44  **QUALITATIVE ASSESSMENT OF ALGAE HARMFUL BLOOM IMPACT  IN AUTUMN 2020 OFF THE COAST OF SOUTH-EASTERN KAMCHATKA  (NORTH-WEST PACIFIC) ON SHALLOW-WATER BENTHIC COMMUNITIES**  Sanamyan N.P.1, Korobok A.V.2, Sanamyan K.E.1  1 Kamchatka Branch of Pacific Geographical Institute of Far-Eastern Branch of Russian Academy of Sciences, Petropavlovsk-Kamchatsky, Partizanskaya Str. 6.  2 Kamchatka Department for Hydrometeorology and Environmental Monitoring, Petropavlovsk-Kamchatsky, Molchanov Str. 12.  The results of monitoring of the benthic communities’ state during two years after the ecological catastrophe caused by an outbreak of planktonic microalgae off the coast of Kamchatka in autumn 2020 were presented. The consequences of this phenomenon led to the mass extinction of bottom organisms. As a result, in the zone of the upper sublittoral, a strong depletion of the benthic fauna occurred, not only many species, but also entire groups of animals fell out of its composition: most of the sponges and about a half of species  of sea anemones, mollusks, echinoderms, ascidians have disappeared. However, the quantity of some groups of Crustacea has increased significantly.  **Key words:** benthos, biodiversity, death, “red tide”, mass vegetation of microalgae, depletion of fauna, ecological catastrophe. |
| УДК 574.583 DOI: 10.17217/2079-0333-2023-63-45-65  **Nutritional relationships between fish pelagic larvae and planktonic organisms in adjacent Kamchatka waters**  Grigorev S.S.1, Sedova N.A.2  1 Kamchatka Branch of Pacific Geographical Institute of the Far Eastern Branch of the Russian Academy of Sciences, Petropavlovsk-Kamchatsky, Partizanskaya Str. 6.  2 Kamchatka State Technical University, Petropavlovsk-Kamchatsky, Klyuchevskaya Str. 35.  The nutritional relations between fish larvae and zooplankton organisms in marine waters off Kamchatka Peninsula based on the ichthyoplankton samples as well as changes in the diet of fish larvae in Kamchatka waters are considered. In spring, the most suitable food organisms for small fish larvae are polychaeta larvae, Cirripedia and Calanoida nauplii, small forms of copepods, mollusks, juveniles of amphipods. In early summer larvae of Polychaeta, nauplii of Cirripedia and Calanoida, small forms of Cladocera and Copepoda are also available. The main forage organisms for larger larvae are furcilia and calyptopis of euphausiids, small larvae of Decapoda. In the second half of summer, larger forms, mainly of the same organisms, are available for late larvae of many fishes. The relationship between the distribution of marine fish larvae and zooplankton organisms is shown. A list of available food organisms for fish larvae during pelagic development has been compiled. Three main trophic groups have been proposed.  **Key words:** zooplankton, copepods, food organisms, fish larvae, nauplii, nutrition. |
| УДК 639.2.053.7 DOI: 10.17217/2079-0333-2023-63-66-77  **ON COMMERCIAL EXPLOITATION OF BIOLOGICAL RESOURCES  IN WATERS OF KAMCHATKA TERRITORY**  Dyakov Yu.P.1, Bugaev A.V.2  1 All-Russian Non-Government Organization “Russian Geographical Society”, St. Petersburg, Grivtsov Pereulok 10A.  2 Kamchatka Branch of the Russian Federal Research Institute of Fisheries and Oceanography (KamchatNIRO), Petropavlovsk-Kamchatsky, Naberezhnaya Str. 18.  The dynamics of commercial catch of biological resources during the second decade (2011–2020) of the 21st century in sea waters adjacent to the Kamchatka Territory was characterized in the article. The level of such catch is estimated in comparison with the previous decade; a comparative assessment of the operated species is made. The structure conformity of the actual biological resources catching with the predicted one is considered. It was established that according to the degree of predicted catch development herring and salmon were in the lead, crabs were in third place and pollock was the fourth one. A significant poor catch was observed in relation to other important fishery objects and the most pronounced was for mollusks.  **Key words:** aquatic bioresources, catch, marine fish, commercial invertebrates, fishing areas |
| УДК (639.2.053+639.28):595.384.2"2018"(265.53) DOI: 10.17217/2079-0333-2023-63-78-86  **MONITORING OF THE BLUE CRAB FISHERY (*PARALITHODES PLATYPUS* BRANDT)  IN THE THROAT OF SHELIKHOV BAY IN JANUARY 2018**  Korostelev S.G.  Kamchatka Branch of Pacific Geographical Institute of the Far Eastern Branch of the Russian Academy of Sciences, Petropavlovsk-Kamchatsky, Partizanskaya Str. 6.  It is stated that January there is the most intensive blue crab fishing period in the Shelikhov Bay during the year. At the same time, the catch of males of commercial size per day was 13.474 tons or 7600 pcs. However, this value does not reflect the real possibility of catching per day, since it is limited to the possibility of raw material processing per day (15–16 tons). Information on the size-weight composition of catches and the biological state of crabs is given, as well as the species composition of the by-catch of other species of fish and invertebrates in trap fishing is analyzed.  **Key words:** biological state, Shelikhov Bay, opilio snow crab, bycatch, Blue crab, catches. |
| УДК 504.5:582.252 DOI: 10.17217/2079-0333-2023-63-87-100  **INFLUENCE OF HEAVY METALS ON POPULATION DYNAMICS  AND PHOTOSYNTHETIC APPARATUS OF *ALEXANDRIUM AFFINE* (DINOPHYTA)[[1]](#footnote-1)\***  Markina Zh. V.1, Ognistaya A.V. 1, 2, Zinov A.A.1, 2  1 A.V. Zhirmunsky National Scientific Center of Marine Biology, Far Eastern Branch, Russian Academy of Sciences, Vladivostok, Palchevsky Str. 17.  2 Far Eastern Federal University, Vladivostok, Island Russkiy, Ajax Village 10.  The effect of heavy metals: cadmium, lead, nickel (in concentrations of 10 and 20 µg/l), zinc and iron (50 and 100 µg/l) on the dynamics of population, cell morphology and photosynthetic apparatus (according to the content of photosynthetic pigments – chlorophyll *a* and carotenoids, chloroplast fluorescence) of *Alexandrium affine* dinophyte algae during 7 days. It was shown that cadmium had the most depressing effect on the algae: the number of cells decreased and did not recover by the end of the experiment. There was also a decrease in the content of photosynthetic pigments. The addition of lead led to a slight increase in the number of cells, while the content of photosynthetic pigments increased. The presence of nickel, iron and zinc in the medium provoked an increase in the number of cells, but the content of chlorophyll *a* and carotenoids decreased. All metals led to changes in chloroplast fluorescence and morphological disorders of cells.  **Key words:** iron, cadmium, nickel, lead, zinc, fluorescence, chlorophyll *a*, cell number, carotenoids, *Alexandrium affine*. |
| УДК 575.224:567.8:535.3 DOI: 10.17217/2079-0333-2023-63-101-112  **INFLUENCE OF EHF RADIATION ON FREQUENCY OF MICRONUCLEI  AND NUCLEAR ANOMALIES IN AMPHIBIAN LARVA ERYTHROCYTES**  Kryukov V.I., Zhuchkov S.A., Lazareva T.N., Kireeva O.S., Popovicheva N.N.  Orel State Agrarian University named after N.V. Parakhin, Orel, General Rodin Str. 69.  The level of technogenic non-ionizing electromagnetic radiations of various frequencies constantly grows in the biosphere. Therefore, studies of these radiations influence on biological organisms are very actual. The purpose of the work was to study the consequences of prolonged exposure to EHF radiation on the stability of the genome of anurans. Larvae of the green toad (*Bufo viridis*) were subjected to EMR at four different EHF frequencies (34.52, 34.67, 34.79, and 35.04 GHz with an energy flux density of 4.88, 5.33, 4.94, and 3.76 mW/cm2, respectively) for 120 hours. After irradiation the frequencies of micronuclei (MN) and nuclear anomalies (NA) in peripheral blood erythrocytes of tadpoles were studied. EHF radiation with a frequency of 34.52 GHz induced a small and statistically insignificant increase in the frequency of MN and NA. Exposure to EHF radiation at frequencies of 34.67, 34.79, and 35.04 GHz caused a statistically significant increase in the frequency of MN and NA in tadpole erythrocytes. A statistically significant increase of the frequency of MN and NA in anuran larvae erythrocytes after exposure to EHF radiation proves a certain danger of an increasing level of EMR in the biosphere, as well as the need for further studies of the effect of non-ionizing radiation on the genomes of lower vertebrates.  **Key words:** amphibians, EHF-radiation, micronuclei, mutagenicity, erythrocytes, nuclear anomalies. |

1. \* The work was carried out with the financial support of the Russian Science Fund grant (project № 21-74-30004) [↑](#footnote-ref-1)