**Bulletin 59**

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| УДК 621.391.821 DOI: 10.17217/2079-0333-2022-59-6-14  **GEOPHYSICAL ASPECT OF A CATASTROPHIC LAUNCH**  **of STARLINK SATELLITES**  Sivokon V.P.1, 2  1 Kamchatka State Technical University, Petropavlovsk-Kamchatskу, Klyuchevskaya Str. 35.  2 Institute of Cosmophysical Research and Radio Wave Propagation, Far Eastern Branch of the Russian Academy of Sciences, Paratunka village, Mirnaya Str. 7.  On February 3, 2022, as part of the SpaceX program, the next Falcon 9 carrier with Starlink satellites was launched. The launch was unsuccessful, which led to the loss of 40 out of 49 satellites. According to SpaceX experts, the cause of this event was an increase in the density of the atmosphere in the intermediate orbit, due to a magnetic storm, followed by deceleration and loss of satellites. Based on the analysis of the geomagnetic situation, the article shows that it is not enough to limit ourselves to consider only a possible change in the density of the atmosphere as the cause of the catastrophe. Most likely, the reason is complex and involves, among other issues, a failure in the operation of the radio-electronic equipment of the satellites due to induced currents and their electrification.  **Key words:** induced currents, magnetic storm, satellite systems, electrojet. |
| УДК 664.952/.957:594.5 DOI: 10.17217/2079-0333-2022-59-15-23  **INVESTIGATION OF THE QUALITY, SAFETY AND NUTRITION VALUES  OF DRIED FOOD PRODUCTS FROM INTEGRATED SQUID TISSUES** Blagonravova M.V., Samokhin А.В. Kamchatka State Technical University, Petropavlovsk-Kamchatskу, Klyuchevskaya Str. 35.  The results of studies of organoleptic parameters, chemical composition, nutritional and energy value of dried food products from the skin of Pacific and Commander squid, obtained by drying with infrared rays and subsequent grinding were presented in the article. It is shown that the developed product is a high-protein and multicomponent one. A high content of lipids and minerals in dried products has been established. The presence of essential microelements (copper, zinc and manganese) was determined. It has been established that the developed product fully complies with the requirements of regulatory documents in terms of lead and cadmium content. The high organoleptic properties of dried products were shown.  **Key words:**squid skin, Commander squid *Berryteuthis magister*, dried food products, Pacific squid *Todarodes pacificus*. |
| УДК 641.51:637.523 DOI: 10.17217/2079-0333-2022-59-24-37  **SUBSTANTIATION OF FUNCTIONAL PRODUCT “FISH SAUSAGES” TECHNOLOGY**  **FOR YOUNGER CHILDREN**  Klyuchnikova L.A.1, Badmaeva I.I.2  1 Siberian University of Consumer Cooperation, Novosibirsk, K. Marx Avenue 26.  2 East Siberian State University of Technology and Management, Ulan-Ude, Klyuchevskaya Str. 40v.  Expanding of food products range for younger children (3–7 years old) through the development of a new technology of functional products is an actual research topic, since the products of this group available  on the market do not have a wide choice. The research results upon the justification of the functional product ‟Fish sausages” technology using local raw materials and modern technological equipment are presented in the article. Optimal heat treatment modes of research objects are determined. A technological scheme of cooking has been developed. A sensory analysis of the developed product was carried out; the quality and safety indicators of fish sausages were studied.  **Key words:** Baikal oilfish fat, younger age, steam convectomat, Baikal roach, fish sausages, functional products. |
| УДК 597.2/5(265.52) DOI: 10.17217/2079-0333-2022-59-38-48  **COMPOSITION OF THE COASTAL ICHTHYOFAUNA OF THE SOUTH-EASTERN KAMCHATKA AFTER HARMFUL ALGAL BLOOM IN AUTUMN 2020**  Tokranov A.M.  Kamchatka Branch of Pacific Geographical Institute FEB RAS, Petropavlovsk-Kamchatsky, Partyzanskaya Str. 6  The data on the composition of the ichthyofauna and relative quantity of common species of fishes in the littoral and the upper sublittoral zones in the coastal waters of the South-Eastern Kamchatka are provided basing on the analysis of the results of hook catches, collections made in the intertidal zone, and underwater photo- and video records performed in the May – September 2021. The obtained results show that the impact of the negative effect of harmful algal bloom in the autumn of 2020 on the composition of the species and quantity of fishes, inhabiting the intertidal zone, is very insignificant. Unfavorable ecological conditions in the upper sublittoral zone (2–25 m) in the South-Eastern Kamchatka in the autumn 2020 caused decrease the quantity of some fishes (mainly species of the family Stichaeidae) which hide on the bottom in the rock crevices or are buried in silty-sand bottom. But unfavorable ecological conditions practically had no influence on the quantity and mode of life of the representatives of ichthyofauna which were able to leave temporarily the coastal waters with harmful algal bloom areas.  **Key words:**species composition, harmful algal bloom, coastal ichthyofauna, intertidal zone, South-Eastern Kamchatka. |
| УДК 597.317.1(265.53) DOI: 10.17217/2079-0333-2022-59-49-61  **NEW DATA ON FISHERIES AND STOCKS OF STINGRAYS (FAMILY ARHYNCHOBATIDAE) FROM WESTERN COAST OF KAMCHATKA**  Vinogradskaya A.V.1, 2, Matveev A.A.1, Terentyev D.A.1  1 Kamchatka Branch of Russian Federal Research Institute of Fisheries and Oceanography (KamchatNIRO), Petropavlovsk-Kamchatsky, Naberezhnaya Str. 18.  2 Kamchatka State Technical University, Petropavlovsk-Kamchatsky, Klyuchevskaya Str. 35.  The results of long-term studies of fishing catch dynamics, biomass and size composition of stingrays off the western coast of Kamchatka from 1980 to 2019 are presented. As we show, in recent years the largest part of stingrays has been caught in the Kamchatka-Kurilskaya subzone. The main tool of their extraction is the bottom layer, as it made 82.7%. The multiyear biomass averaged over 5 years ranged from 3 071.7 tons (1996–2000) to 12 323.6 tons (1986–1990), and made 5 954.0 tons on average. The most significant species due to the stock volume are *Bathyraja maculata*, *B. parmifera*, and *B. violacea*.  **Key words:** biomass, western Kamchatka shelf, Sea of Okhotsk, fishing, size composition, stingrays. |
| УДК: 597.556.35(265.52) DOI: 10.17217/2079-0333-2022-59-62-74  **PUBERTY OF TWO SPECIES OF FLOUNDER  (*PLEURONECTES QUADRITUBERCULATUS* AND *LIMANDA ASPERA*)  (PLEURONECTIDAE) OFF THE COASTS OF SOUTH-EASTERN KAMCHATKA**  Ovcherenko R.T.1, 2  1 Kamchatka Branch of the All-Russian Research Institute of Fisheries and Oceanography (KamchatNIRO), Petropavlovsk-Kamchatsky, Naberezhnaya Str. 18.  2 Kamchatka State Technical University, Petropavlovsk-Kamchatskу, Klyuchevskaya Str. 35.  The paper presents the characteristics of sexual maturation of the yellowfin sole *Limanda aspera* and the lemon sole *Pleuronectes quadrituberculatus* off the coast of southeastern Kamchatka in 1959–2020.  The proportion of mature fish depending on the length was analyzed on the basis of empirical and theoretical data, the dynamics of maturation of the gonads of males and females of two flounders by months was characterized. In the Pacific waters of Kamchatka, males and females of the yellowfin sole mature at a smaller size than in the eastern part of the Bering Sea and at a larger size than off the coast of Western Kamchatka. Mass maturation of lemon sole takes place first in the eastern part of the Bering Sea, then near southeastern Kamchatka, and lastly on the western Kamchatka shelf.  **Key words:**length, yellowfin sole, spawning, puberty, stages of gonadal maturity, Pacific waters of Kamchatka, lemon sole, Pleuronectidae. |
| УДК 598.279.24(571.66) DOI: 10.17217/2079-0333-2022-59-75-89  **THE FEEDING OF GYRFALCON (*FALCO RUSTICOLUS*, FALCONIFORMES, FALCONIDAE) IN KAMCHATKA**  Lobkov E.G.  Kamchatka State Technical University, Petropavlovsk-Kamchatsky, Kluchevskaya Str. 35.  In Kamchatka, an investment project is being implemented for the artificial reproduction of rare species  of falcons, primarily gyrfalcon. For successful breeding of birds, it is necessary to know their trophic preferences in nature. The article analyzes information on the nutrition of the gyrfalcon in Kamchatka, collected over the entire history of ornithological research in the region. In the diet of the gyrfalcon, minimum 41 species of birds and 11 species of mammals are identified. The composition of the food of specific individuals is determined by their habitat in a given season of the year. During the breeding season, ptarmigans (*Lagopus lagopus*, *L. mutus*) are crucial for most gyrfalcons, and small mammals (specially American (arctic) ground squirrel *Spermophilus parryi*)are also important in the mountains. On migrations and in winter (especially on Kamchatka Peninsula), an important role is played by water, near-water and synanthropic species of birds. In Koryak Highland in winter an important role is played ptarmigans as usual. Occasionally they feed on fish processing waste and bait in hunters' traps.  **Key words:**American ground squirrel, water birds, Kamchatka, Gyrfalcon, ptarmigans, small mammals, feeding, diets. |
| УДК 620.952:582.272 DOI: 10.17217/2079-0333-2022-59-90-105  **POSSIBILITIES OF USING BROWN SEAWEEDS IN BIOGAS PRODUCTION**  Shushpanova D.V., Kapralova D.O. RUDN University, Moscow, Miklukho-Maklaya Str. 6. It is proposed to use seaweeds of the order Laminariales growing in the waters of the White, Barents and Okhotsk seas for biogas production as an alternative fuel. A preliminary assessment of the life cycle of biogas production from brown seaweeds, including the use of substandard raw material or seaweeds from storm emissions has been carried out. The obstacles to their use from the point of view of economics, legislation and logistics are indicated.  **Key words:** biogas, brown seaweed, life cycle assessment, plant biomass, plant raw material. |