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Ichthyological studies at Russian Geophysical Observatory "Mirnyj" (Antarctic) in winter 1979

The report covers the authors research in period from 27 December 1978 to 18 January 1980 at Russian Antarctic Station Mirnyj (66°33′ S, 93°01′ E) during the 24 Russian Antarctic Expedition (24 SAE), due to an agreement between the Department of Polar Research of the Institute of Ecology, PAS, and the Scientific Research Institute of Arctic and Antarctic (AANII) in Leningrad. The research program was a part of problem MR-II-16. The diurnal changes of the respiratory metabolism of certain antarctic species of fish were monitored in the winter season, the determinations of calorific values of fish bodies were made, too. The morphometric measurements of fish were also made.

An expedition started on 19 November 1978 on board of a Polish ship M/S "Zawichost" going from Gdynia to Antarctic. The return cruise Antarctic-Odessa was made on board of a Russian ship M/S "Baškiria". An expedition ended in the Warsaw-Okęcie airport on 26 February 1980.

a) The catches of antarctic fish were made from the ice barrier and from the shores of Stroiteley Island in period January-May 1979, and from under the ice from mid-May to November 1979. The spinning and ice rods equiped with special hooks were used. The raw beef and fish meat were used as bite. Catches were rather poor in 1979. Also the species composition of the caught fish was not much differentiated. A benthic species *Trematomus bernacchii* Boul. and a pelagic one *Trematomus borchgrevinki* Boul. dominated. The following species were caught sporadically: *Trematomus nicolai* Boul., *Trematomus hansoni* Boul., *Trematomus pennelli* Regan and *Trematomus newnesi* Boul. Only two first species were studied.

b) The intensity of fish respiration was measured in the "deep water respirometer" ("D-WR"), designed by author, suspended in the ocean at the depth of 10 m. The water temperature was measured each time at this depth, and twice a month — in the whole vertical transect. Such method of "in situ" measurements of fish respiration was applied in Antarctic for the first time. The amount of oxygen consumed by fish (from differences of the oxygen content in the respirometer for the consequent measurements) was determined by Winkler method. The water for analyses was sampled every 2 h for 26 h. A total of 1014 respiration measurements of *T. bernacchii* and T. *borchgrevinki* were performed. A significant variation of the respiratory metabolism of fish was found. Results are studied.

c) The taxonomic part of presented studies was an attempt to show do the usually registered proportions of the fish body change, and to what extent, with the growth of individuals. The easily accessible species *T. bernacchii* was studied. The measurements covered 19 of the so called plastic features of 171 fish of the total lenght from 110.2 mm to 265.0 mm. Statistically sound changes of 11 proportions with the growth of fish was estabilished. The next five proportions changed in not significant way, three proportions did not change at all with the fish growth. The majority of proportions showed curvilinear changes, thus not allowing to extrapolate the results for the fish sizes not included in the collected material. The above research was the first of this type of taxonomic observations made for the antarctic fish.

d) The calorific value of the meat and liver tissues of *T. bernacchii* was estimated in May and August 1979. A total of 184 samples were combusted in the calorimetric bomb, 45 samples were ashed in the muffle furnace.

About 6—8 weaks before the natural breeding, in October 1979, an attempt to stimulate the oocytes development in females of *T. bernacchii* was made in the laboratory conditions. The mature females obtained (by injection) the prescribed in the literature doses of gonadotropic preparations: "Biogonadyl", "Clostilbegyt" and "Dezoxycortonum". The experiment covered 40 individuals — positive results were not observed.

The over a year long research in the East Antarctic supplied a lot of interesting biological data. The near shore zone of the Davis Sea in the region of Mirnyj Station is a difficult but interesting area for oceano-biological studies. A considerable isolation of this area from the open South Indian Ocean caused a creation of a specific micro-environment, characterised by the occurrence of biocenoses not found in the other regions of the Antarctic.

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