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Environmental conditions and biological community of the Penzhina and Talovka hypertidal estuary (Northwest Kamchatka) in the ice-free season

Maksim Koval¹ and Sergey Gorin² ¹KamchatNIRO, Russia ²VNIRO, Russia

Tew data on the abiotic conditions; species composition; abundance, distribution, and migrations of fauna; and feeding N interactions in an estuary ecosystem were obtained during expeditions in the mouths of Penzhina and Talovka rivers (Northwest Kamchatka), June-September 2014-2015. It is revealed that in the ice-free season, the hydrological regime of the estuary is determined by seasonal fluctuations of river runoff, as well as fortnightly and daily variation of tides. The estuary is characterized by hypertidal fluctuations (up to 10–12 m); strong reverse flows (up to 1.0–1.5 m/s), considerable tidal variations in salinity (from 0 to 6-9‰ at the river boundary and from 6-8 to 14-16‰ at the offshore boundary), and high water turbidity (up to 1 000 NTU or more). Based on the spatial structure of the community, three ecological zones with mobile boundaries are distinguished: freshwater (salinity 0-0.1%), estuarine (0-12.3%), and neritic (11.2-18.9%). High turbidity prevents the development of phytoplankton in the estuarine zone (EZ), and the local benthic community is significantly depleted due to the desalination and widespread of aleuritic silts. Neritic copepods and nektobenthic brackish-water crustaceans generate the maximum abundance and biomass here. The species that have adapted to the local extreme hydrologic conditions dominate and form the basis of the estuarine food chain. Dominant among the EZ vertebrates are such groups as anadromous fishes (smelts, pacific salmons, charrs, and sticklebacks); waterfowl (terns, kittiwakes, cormorants, fulmars, puffins, guillemots, auklets, and wadepipers); and predatory marine mammals (larga, ringed seal, bearded seal, and white whale). The total abundance and biomass of these animals are much higher in the pelagic EZ in comparison to neighboring zones. The scheme of the food web of the Penzhina and Talovka hypertidal estuary was constructed.

Biography

Maksim Koval graduated from the Far East Technical University of Fishery Industry (Vladivostok, Russia) in 1994 (specialties: hydrobiology and ichthyology). Same year began to work in Kamchatka Research Institute of Fisheries and Oceanography (KamchatNIRO, Petropavlovsk-Kamchatsky). In 1994-2011 was participant and coordinator of marine research expeditions in offshore and coastal water of the North Pacific and the Far East Seas (including international cruises under North Pacific Anadromous Fish Commission programs). In 2007 has defended a PhD with the dissertation "Forage base and feeding particularities of Pacific salmon in the Kamchatkan waters of the Okhotsk and Bering seas and in the northern part of the Pacific Ocean". Since 2012 main research project: Ecology of Coastal, Estuarine and Freshwater Ecosystem of the Kamchatka.

koval.m.v@kamniro.ru

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