

Fish schools behaviour can be manipulated

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Acoustical properties of the water environment are such that sound oscillations in water have a weaker damp and extends to more distances, than in air (especially on low frequencies). Its uniqueness and the important advantage of an underwater sound consists of comparison with electromagnetic waves, including light and electric fields, which have much smaller distant opportunities in sea water (owing to its electroconductivity). Researchers have shown that many species of fishes and some sea invertebrates possess developed acoustical reception allowing them to perceive sounds and to define a direction on their source in a wide frequency range. Acoustic behavior of the some physostomous fish species: Salmonidae and Clupeidae have been investigated. The maximum number of fish sounds were recorded at twilight with the slowly decreases of acoustical activity in the morning. The basic significance of an acoustic channel for communication and orientation between individuals in fish school and between of one fish species schools in dark time is assumed when bad visual contacts. Spectral distribution and level of the signals depend on the size (species) of fish: the smaller object have higher frequency and the lower amplitude of sound. We have confirmed that sound producing organs of physostomous fish is the swimming bladder and pneumatic duct with the muscular sphincter. Hearing abilities of fish and spectral-energy characteristics of its signals has been compared. Frequency range with the maximum energy of fish signals spectrum emitted with swim bladder coincides with range of the highest acoustical sensitivity of fish. The levels of fish signals appreciably exceed hearing thresholds of fish. It means that fish can perceive these signals to long distances. It is connected obviously to simultaneous participation of swim bladder in sound reception and in sound producing. Similarity of frequency ranges of emitted and perceived sounds indirectly confirms their signal importance for fish. The radiators models, simulating sounds of fish with the use of hydro-bionics methods was created. Comparative assessment of the moving reactions of fish in cage and in open basin have shown the ability of spectral-time recognition and localization of fish sounds simulators. The remote manipulate of fishes movement and attraction of fish to the source of sounds opportunity has been proved.

Biography

Michail Kuznetsov has completed his Ph.D in 1996 from Far East State Technical Fish Industry University. At present time he is a manager of Fishery Hydroacoustics Laboratory of Pacific Scientific Research Fisheries Center. He has published more than 100 scientific and methodical papers and patents. The basic scientific interests are connected with fish behaviour, bioacoustics, simulating signals of fish and cetacean, innovations in the fishery acoustics.

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