Chapter 1 : Ecology of Teleost Fishes by R.J. Wootton

The second edition of this highly respected book retains the aims and structure of the first edition, emphasizing the responses of individual fish to their environment and the consequences of these responses for the population and community to which the individuals belong.

Also contains information relating to the behaviour of fish to their commercial exploitation. This book will be a valuable reference for all those interested in animal behavior and workers in fish biology and fisheries. Since the first edition published in , this updated, rewritten second edition provides much more new information. Danzman et al; motivational basis of fish behaviour, P. Colgan; development of behaviour in fishes, F. Part 2 Sensory modalities: Muntz; underwater sound and fish behaviour, A. Hawkins; role of olfaction in fish behaviour, T. Hara; role of the lateral line in fish behaviour, H. Part 3 Behavioural ecology: Hart; predation risk and feeding behaviour, M. Milinski; teleost mating behaviour, G. C Sargent and M. Gross; functions of shoaling behaviour in teleosts, T. Pitcher; individual differences and alternative behaviours, A. Magurran; fish behaviour by day, night and twilight, G. Helfman; intertidal teleosts - life in a fluctuating environment, R. Gibson; behavioural ecology of sticklebacks, G. Wooton; behavioural ecology of cave-dwelling fishes, J. Part 4 Applied fish behaviour: Wardle; fish behaviour and the management of freshwater fisheries, K.

Chapter 2 : Ecology of teleost fishes - Robert J. Wootton - Google Libros

Robert J. Wootton is the author of Ecology of Teleost Fishes (avg rating, 1 rating, 0 reviews, published), Fish Ecology (avg rating, 0 rati.

Swim bladder from a bony teleost fish How gas is pumped into the swim bladder using counter-current exchange. The swim bladder normally consists of two gas-filled sacs located in the dorsal portion of the fish, although in a few primitive species, there is only a single sac. It has flexible walls that contract or expand according to the ambient pressure. The walls of the bladder contain very few blood vessels and are lined with guanine crystals, which make them impermeable to gases. By adjusting the gas pressurising organ using the gas gland or oval window the fish can obtain neutral buoyancy and ascend and descend to a large range of depths. Due to the dorsal position it gives the fish lateral stability. In physostomous swim bladders, a connection is retained between the swim bladder and the gut , the pneumatic duct, allowing the fish to fill up the swim bladder by "gulping" air. Excess gas can be removed in a similar manner. In more derived varieties of fish the physoclisti the connection to the digestive tract is lost. In early life stages, these fish must rise to the surface to fill up their swim bladders; in later stages, the pneumatic duct disappears, and the gas gland has to introduce gas usually oxygen to the bladder to increase its volume and thus increase buoyancy. In order to introduce gas into the bladder, the gas gland excretes lactic acid and produces carbon dioxide. The resulting acidity causes the hemoglobin of the blood to lose its oxygen Root effect which then diffuses partly into the swim bladder. The blood flowing back to the body first enters a rete mirabile where virtually all the excess carbon dioxide and oxygen produced in the gas gland diffuses back to the arteries supplying the gas gland. Thus a very high gas pressure of oxygen can be obtained, which can even account for the presence of gas in the swim bladders of deep sea fish like the eel , requiring a pressure of hundreds of bars. Together with oxygen, other gases are salted out[clarification needed] in the swim bladder which accounts for the high pressures of other gases as well. In shallow water fish, the ratios closely approximate that of the atmosphere , while deep sea fish tend to have higher percentages of oxygen. For instance, the eel Synaphobranchus has been observed to have Physoclist swim bladders have one important disadvantage: Physostomes can "burp" out gas, though this complicates the process of re-submergence. The swim bladder in some species, mainly fresh water fishes common carp , catfish , bowfin is interconnected with the inner ear of the fish. They are connected by four bones called the Weberian ossicles from the Weberian apparatus. These bones can carry the vibrations to the saccule and the lagena anatomy. This increases the ability of sound detection. In some deep sea fishes like the Antimora , the swim bladder maybe also connected to the macula of saccule in order for the inner ear to receive a sensation from the sound pressure. The sounds created by piranhas are generated through rapid contractions of the sonic muscles and is associated with the swimbladder. The swim bladder has, also, been worked in as an accessory to the auditory organs of certain fishes. According to this view it may be inferred that all vertebrate animals with true lungs are descended by ordinary generation from an ancient and unknown prototype, which was furnished with a floating apparatus or swim bladder. Charles Darwin , [3] Swim bladders are evolutionarily closely related i. In , Farmer proposed that lungs evolved to supply the heart with oxygen. In fish, blood circulates from the gills to the skeletal muscle, and only then to the heart. During intense exercise, the oxygen in the blood gets used by the skeletal muscle before the blood reaches the heart. Primitive lungs gave an advantage by supplying the heart with oxygenated blood via the cardiac shunt. This theory is robustly supported by the fossil record, the ecology of extant air-breathing fishes, and the physiology of extant fishes. There are no animals which have both lungs and a swim bladder. The cartilaginous fish e. Teleost fish with swim bladders have neutral buoyancy, and have no need for this lift. Deep scattering layer Most mesopelagic fishes are small filter feeders which ascend at night using their swimbladders to feed in the nutrient rich waters of the epipelagic zone. During the day, they return to the dark, cold, oxygen deficient waters of the mesopelagic where they are relatively safe from predators. Sonar operators, using the newly developed sonar technology during World War II, were puzzled by what appeared to be a false sea floor â€” metres deep at day, and less deep at night. This turned out to be due to millions of marine organisms, most particularly small mesopelagic fish, with swimbladders that reflected the sonar. These organisms migrate up into shallower water at dusk to feed on plankton. The layer is deeper when the moon is out, and can become shallower when clouds obscure the moon. The swim bladder is inflated when the fish wants to move up, and, given the high pressures in the mesoplegic zone, this requires significant energy. As the fish ascends, the pressure in the swimbladder must adjust to prevent it from bursting. When the fish wants to return to the depths, the swimbladder is deflated. The estimated global biomass of lanternfish is â€” million metric tonnes , several times the entire world fisheries catch. Sonar reflects off the millions of lanternfish swim bladders, giving the appearance of a false bottom. Swim bladders are also used in the food industry as a source of collagen. They can be made into a strong, water-resistant glue, or used to make isinglass for the clarification of beer. A fish with swim bladder disorder can float nose down tail up, or can float to the top or sink to the bottom of the aquarium. Physostomes can release air in order to decrease the tension in the gas bladder that may cause internal injuries to other vital organs. It simulates high-energy sound waves in aquatic far-field, plane-wave acoustic conditions. This organ is unrelated to the one in fish.

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Chapter 6 : Robert J. Wootton (Author of Ecology of Teleost Fishes - Second Edition Volume 24)

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