

A NOTE ON THE NASAL STRUCTURES OF FISHES OF
THE SUBORDER NOTOTHENIOIDEI
(PISCES, PERCIFORMES)
(EXTENDED ABSTRACT)

Tetsuo IWAMI

*Laboratory of Biology, Tokyo Kasei Gakuin College,
2600 Aihara, Machida-shi, Tokyo 194-02*

The basic nasal structure of teleostean fishes is a pair of ovoid cavities, each connected to the outside by two openings, the anterior and posterior external nostrils. Certain fishes, such as cichlids, zoarcids and notothenioids, have only a single opening into each nasal cavity. Although mention was made by many authors on the number of the external nostrils in notothenioid fishes, the internal structure of their nasal organ seems not to have been treated of.

The author certified that all five families of the suborder Notothenioidei, the Bovichthyidae, Nototheniidae, Harpagiferidae, Bathydraconidae and Channichthyidae, have a single external nostril and found that there is an accessory nasal sac associated with the main cavity (Fig. 1). This structure, the accessory nasal sac, seems to have never been described in these fish groups. The accessory nasal sac of the notothenioid fishes is situated beneath the main nasal cavity and is slightly larger in size than of the main one

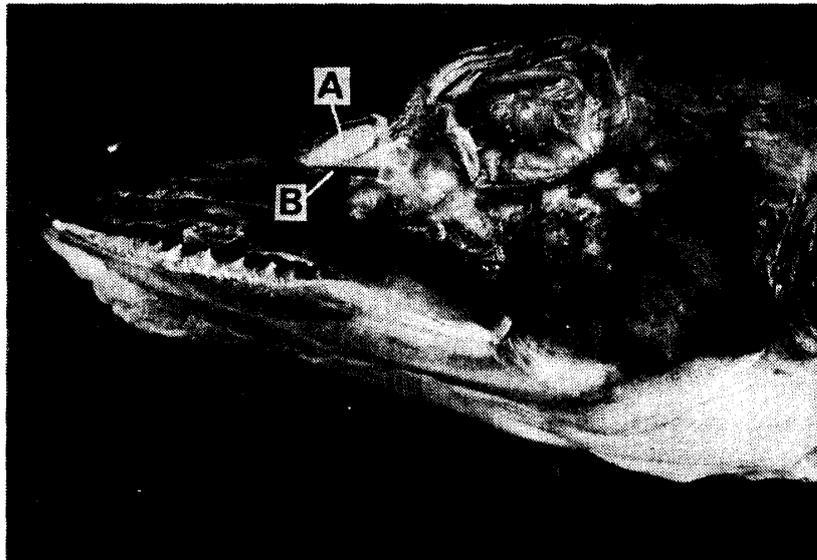


Fig. 1. Lateral view of the left nasal cavity of the channichthyid fish, Chionodraco rastrospinosus DEWITT and HUREAU. A. the rosette of olfactory lamellae; and B. entrance to the accessory nasal sac.



Fig. 2. *Pseudochaenichthys georgianus* NORMAN, the channichthyid fish. Ventral view of the right accessory nasal sac, stained by hematoxylin (arrow). The palate covering the right accessory nasal sac is removed.

(Fig. 2). Unlike the internal nostrils of some fishes the accessory sac has no passage-way opening into the oral cavity and is separated from the oral cavity.

The function of the accessory nasal sac could be understood by observations of living materials, histological study of the structure and comparative study with the nasal structure of other fishes. Judging only from their morphological features, the following assumption of their function is made here. One of the possibilities of their function is to increase the amount of water entering into the nasal cavity by periodically changing the pressure in the oral cavity. The disadvantage of the decrease in the amount of water entering into the nasal cavity caused by the presence of a single external nostril may be compensated by this function of the accessory nasal sac.

Some, teleosts, e.g. marlines (Istiophoridae), drums (Sciaenidae) and cichlids (Cichlidae), also possess similar accessory nasal sac. These groups of fishes are apparently not related to the Antarctic fish group, the Notothenioidei. The presence of this structure does not always show their close relationships, and is thought to be a result of convergence in these cases. On the other hand, it is also easily supposed that the presence of a single nostril and accessory nasal sac represents derived character states in comparison with the nasal structure of general percoid fishes.

Detailed morphological and developmental studies of the distinctive nasal structure of the notothenioid fishes may throw light on the problem of the systematic position of this group.

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