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NOTE

Morphoanatomy of Olfactory Apparatus of *Pseudapocryptes lanceolatus* (Bloch and Schneider)

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Abstract

Olfactory apparatus of *Pseudapocryptes lanceolatus* (Bloch and Schneider), a teleostean gobiid fish, comprises olfactory chambers, olfactory lamella, ethmoidal sacs, lachrymal sacs, olfactory nerves and olfactory lobes of brain. These structures act as a chemosensory system in this fish.
Key words : *Pseudapocryptes lanceolatus,* Gobiid, Olfactory, Chemosensory.

Olfaction in fishes is among the most highly developed senses of all vertebrates (Kleerekoper 1969). It is involved in procurement of food, recognition of sex, discrimination between individuals of the same or different species, in defence against predators, in parental care and in migration . The morphoanatomy of olfactory apparatus of teleostean fish was first described by Burne (1909). A good number of workers (e.g., Belanger et al. 2002 Mandal et al. 2005, Chakrabarti and Hazra Choudhury 2007, Baile et al. 2008) have studied on the anatomy of olfactory apparatus of different species. The components of olfactory apparatus exhibit much variation in their number, shape, size, and position from one teleostean family to other. The detail anatomy of olfactory structure of Indian gobiid fish is little known. This investigation is aimed to unfold the detail anatomy of olfactory apparatus of gobiid species *Pseudapocryptes lanceolatus* (Bloch and Schneider).

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Fresh, adult, diseasefree, sex-independent *P. lanceolatus* collected from the local markets of east Midnapore district of West Bengal. Specimens were acclimatized and measured before the experiment. The animal having 10—15 cm in length and 20—30 g in weight were sorted out for the experiment. The animal was anaesthetized by MS-222 (100—200 mg/liter). The olfactory aparatus was dissected out from the dorsal side of the head and fixed in apqueous Bouin's solution. Different part of the olfactory apparatus was studied under light microscope.

Pseudapocryptes lanceolatus (Fig. 1) comprises olfactory chambers, olfactory lamella, ethmoidal sacs, lachrymal sacs, olfactory nerves and olfactory lobes of brain (Fig. 2). The number of the lamella along with other structure shows large variation among teleostean (Burne 1909). In *P. lanceolatus* the olfactory chambers are paired cup-shaped structure and situated in the ethmoid region of the skull. Single olfactory lamella is present in each olfactory chamber. The olfactory lamella is somewhat elongated, sickle-shaped, tubular structure (Fig. 3). The anterior part of the lamella is free but the basal part is partly guarded by olfactory chamber. In Perciformes, the number of the lamella varies from 0 in *Omobranchus elegans* to 64 in *Upeneus bensasi* (Yamamoto 1982). The number of the olfactory lamella in *P. lanceolatus* is only one. As in the other fish, this species also has accessory nasal sacs viz ., lachrymal and ethmoidal sacs (Fig. 3). Both the sacs have a bulbous appearance. The lachrymal sac is located at dorsocaudal region whereas ethmoidal sac is present at ventrocaudal region of the olfactory lamella. There are only two exceptions in this *Trichinus vipera* and *Scombera scombrus* with a single accessory nasal sac (Burne 1909). The function of these accessory nasal sacs is to regulate wa-

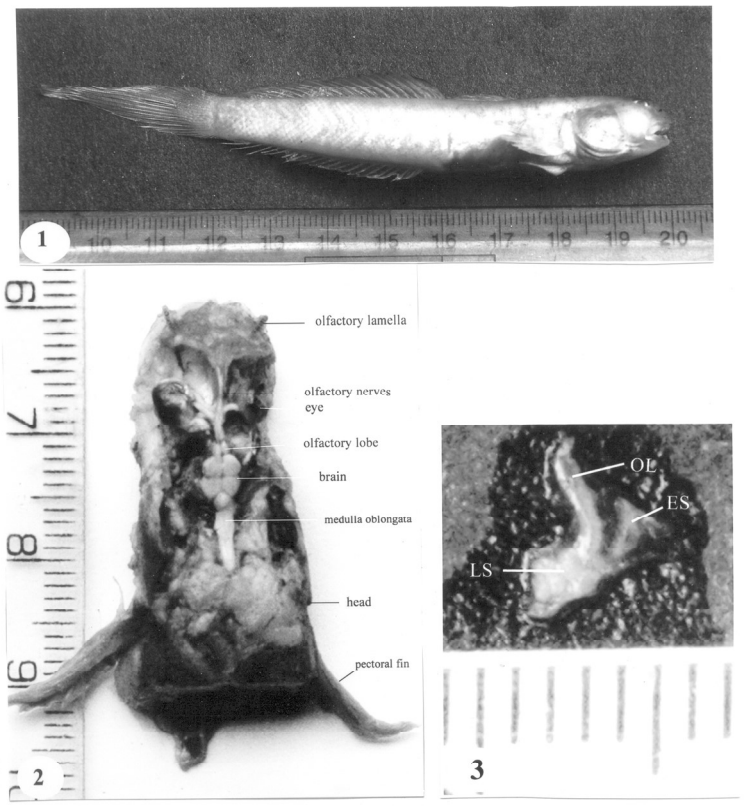

Figure 1. *Pseudapocryptes lanceolatus* (Bloch and Schneider). **Figure 2.** The anatomical position of olfactory apparatus of *P. lanceolatus*. **Figure 3.** The olfactory structure of *P. lanceolatus*. Olfactory lamella (OL), ethmoidal sac (ES)and lachrymal sac (LS).

ter ventilation process by pumping mechanism (Doving et al. 1977). The olfactory lamella is externally lined by olfactory epithelium which plays important role in chemoreception (Bannister 1965). The flow of water with chemical cues is directed over this epithelium by pumping mechanism of accessory nasal sacs. Olfactory nerves are paired, arises from the olfactory lamella and travels parallel, relatively long distance to connect with the olfactory lobes of the brain separately (Fig. 2). Central raphae is a common olfactory part in other teleosts and it is connected with olfactory bulb, but in *P. lanceolatus* no such type of structural association is observed.

References

Baile V. V., N. Raut and Y. V. Bhute. 2008. Organization of olfactory system, forebrain and pituitary gland of a teleost, *Notopterus notopterus. Annl. Neurosci*. 15 : 43—50.

Bannister L. H. 1965. The fine structure of the olfactory surface of teleostean fishes. *Quart. J. Microscop. Sci.* 106 : 333—342.

Belanger R. M., L. D. Corkum and B. Zielinski. 2002. The spatial organization of the peripheral olfactory organ in the round goby *(Neogobius melanostomus). Oceanol. Stud*. 31 : 23—29.

Burne R. H. 1909. The anatomy of the olfactory organ of teleostean fishes. *Proc. Zool. Soc. London* 2 : 610—663.

Chakrabarti P. and S. Hazra Choudhury. 2007. The fine structural organization of the olfactory epithelium of *Cyprinus carpio* (Linnaeus) : A scanning electron microscopic study. *Folia Morph.(Warsz.)* 66 : 10–14.

Doving K. B., M. Dubois-Dauphin, A. Holley and F. Jourdan. 1977.Functional anatomy of the olfactory organ of

fish and the ciliary mechanism of water transport. *Acta Zool*. 58 : 245—255.

Kleerekoper H. 1969. Olfaction in fishes. *Indiana Univ. Press*., London, UK.

Mandal D. K., D. Roy and L. Ghosh. 2005. Structural organization of the olfactory epithelium of a spotted snakehead fish, *Channa punctatus. Acta Ichthyol. Et. Pisca*. 35 : 45—50.

Yamamoto M. 1982. Comparative morphology of the peripheral olfactory organ in teleosts. Pp. 39—59. *In* T. J. Hara (ed). *Chemoreception in fishes.* Elsevier Amsterdam.