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Histological Observations on the Skin of the Head of a Clupeoid Fish, *Gudusia chapra* (HAM. BUCH.)

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JAKUBOWSKI (1960, 1963) investigated the structure and vascularization of the skin of *Cyprinus carpio*, *Pleuronectes flesus luscus*, *Cottus gobio* and *Rhomus maeoticus*. JIMBO *et. al.*, (1963) carried out an electron microscopic observation on the epidermis of the teleost, *Salmo irideus*. KAPOOR reported the histological details on the skin of the head of a Siluroid fish, *Wallago attu* (1965) and a cyprinoid fish, *Catla catla* (in press). This paper deals with the histological features of the headskin of a clupeoid fish, *Gudusia chapra* (Family-Clupeidae).

Pieces of skin of head were fixed in Bouin's fluid. Sections (6-8 μ) were stained with Delafield's haematoxylin and eosin, and as well with Mallory's triple stain.

I wish to express my heartfelt gratitude to Prof. Dr. Toki-o YAMAMOTO, Nagoya University, Nagoya, Japan, for reading and communicating this paper.

Observations

The skin of the dorsal surface of the head consists of epidermis and dermis with an interposed basement membrane. The epidermis has a stratified epithelium possessing flat cells at the free surface, round or polygonal cells in the middle layers and columnar cells in the basal layer resting on a basement membrane. The mucus-cells are quite scanty. The club-cells are totally absent. The taste buds and pit organs have not been observed. The small granular cells occur. The dermis is composed of connective tissue fibres. The pigment-cells of various sizes lie along the basement membrane in the dermis at no uniform spacings. Blood capillaries run in the dermis (fig. 1).

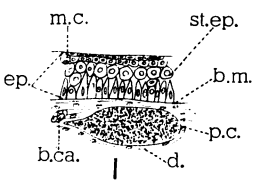

Fig. 1. T. S. Skin of the dorsal surface of the head of *Gudusia chapra*.

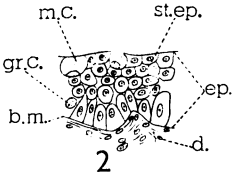

Fig. 2. T. S. Skin of the ventral surface of the head of *Gudusia chapra*.

The skin of the ventral surface of the head has an identical histological structure except that it is devoid of pigment-cells (fig. 2).

Discussion

The number of mucus-cells varies in the skin of fishes. Here, they are sparingly present while their complete lackness has been mentioned in the epidermis of skin of *Cobitis biwae* by MIYADI (1929) and of *Cirrhina mrigala* by ISLAM (1951).

PFEIFFER (1963) states that, from a careful histological comparison of fish species which produce alarm substance and species that do not, the presence of certain type of club-cell in the epidermis could be associated with the presence of the alarm substance. He has given the taxonomic distribution of fright reaction and the alarm substance. Both are limited to the Ostariophysi. All non-Ostariophysi evidently lack the fright reaction. Families Salmonidae and Clupeidae of Order Isospondyli are listed in non-Ostariophysi. The obvious non-existence of club-cells in the epidermis of skin in *Gudusia chapra* strengthens the observations of Schutz (1956) and PFEIFFER (1960) who demonstrated the absence of fright reaction in Clupeidae.

According to MOORE (1950), the taste buds are present in the outer skin of some fishes and lacking in others. My record on the absence of taste buds here is identical with that of MIYADI (1929) in the skin of *Pungitius kaibarae*, and of ISLAM (1951) in the skin of *Cirrhina mrigala* and *Ophicephalus gachua*. It may be inferred that gustatory sense is not an essentiality of life in this plankton-feeder, *Gudusia chapra* as mentioned earlier (KAPOOR, 1958, 1965).

MOORE (1950) mentions that lateral-line organs or superficial neuromasts or both are presumably present in all fishes in a great variety of patterns. SATO (1955) suggests that there is not always a close relation between the abundance of the large pit organs on the head and the existence or development of the canal line. DIJKGRAAF (1963) quotes Clupeids as those free-swimming fishes in which canals on the trunk are apparently lacking. The absence of pit organs here is quite noteworthy and presents physiological problems demanding further investigations.

Summary

The histological observations on the skin of a Clupeoid fish, *Gudusia chapra* (HAM. BUCH.) have been described. The skin is composed of epidermis and dermis with an intermediate basement membrane. The stratified epidermis has a few mucus-cells. The club-cells are lacking. The taste buds and pit organs have not been observed. Granular cells are present. The dermis contains pigment-cells and blood capillaries. The ventral skin shows the absence of pigment-cells.

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Abbreviations

b. ca.—blood capillary ; b. m.—basement membrane ; d.—dermis ; ep.—epidermis ; gr. c.—granular cell ; m. c.—mucus-cell ; p. c.—pigment-cell ; st. ep.—stratified epithelium.