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Study of Chromatophores of Freshwater Fishes from Amravati Local Market

Pooja A. Jadhav
Department of Zoology,
*Vidnyan Mahavidyalaya, Malkapur
Dist. Buldana (MS) India

Prajakta N. Bathe
Department of Zoology
B. S. Patel Arts, Commerce and Science College
Pimpalgaon Kale (MS) India

Abstract:- The aim of this work was to study chromatophores of fishes. Chromatophore is a pigment-containing or light-reflecting cell found in the skin of fishes. of fishes from Chromatophores Amravati local market were studied by using an inverted microscope with an attached camera on 10X magnification. Based on the material representing seven species examination of photograph and Scales fish specimens from head, middle and tail region sides of the body were studied. There was found most abundant light absorbing chromatophore= i.e. melanophores. *Catla catla, Channa punctata, Cirrhinus cirrhosus, Channa striata* and *Tilapia scales* contain large numbers of dendritic shaped melanophores. In Labeo rohita along with melanophores erythrophores are also observed. *Puntius* has a smaller number of melanophores and moderately dispersed pigment granules.

Keywords:- *Chromatophores, Melanophores, Freshwater Fishes, Pigment Granules, Erythrophores*

I. INTRODUCTION

The beautiful colouration, conspicuous patterns and their spectacular changes as displayed by many poikilotherms and invertebrates and specially highly evolved in fish among the vertebrates. Ornamental fishes are now a days rapidly gaining importance because of their aesthetic value and also due to their immense commercial value in the export trade world over. Attractive colouration determines the commercial value of ornamental fish. This colour variability is mediated through activities of integumentary pigment- containing cells, the chromatophores. The colours in the fishes are dependent on different types of chromatophores possessed by the fish on the skin. There are six kinds of chromatophores, each recognized by its colour. The light absorbing chromatophores are the melanophores (black or brown), xanthophores (ocher or yellow), erythrophores (red) and cyanophores (blue). Melanophores are full of melanin-filled granules-the melanosomes, which gives the cells their characteristic brown /black colour. Xanthophores contain the polyene pigments, the carotenoids in their xanthosomes or the carotenoid vesicles, which are insoluble in water. The light reflecting chromatophores are Iridophores and leucophores [1].

The colours and colour patterns of the fishes have various ethological implications as they form a means of communication among members of same as well as other species. The colouration is not only used as a means to protect itself from predation but it also helps to remain inconspicuous in order to catch prey [2][3][4]. The colour patterns used for advertisement are especially common among highly visual, social teleosts and many of the behavioral structures do indicate that many such patterns function as intraspecific signals to attract mates, show aggression or to communicate with young. Based on the speed of response, the instantaneous changes as has been seen in the fish under study are characteristic of many social teleosts in which colour changes are thought to be entirely under neural (sympathetic) control. The overall color pattern of an individual fish depends primarily on the combinations of its chromatophores [5]. The distribution, density, size and relative motility of different types of pigment cells will affect the display of patterning [6]. It has been recognized that fish color changes can be divided into two categories; one is a physiological colour change, which is attributed to rapid motile responses of chromatophores, and the other is a morphological colour change, which results from changes in the morphology and density of chromatophores [7]. In this article current studies on chromatophore of freshwater fishes in Amravati with respect to type of pigment and its density.

II. MATERIAL AND METHOD

The Amravati city Fish market was visited frequently on Friday, when various fishermen collects different varieties of fishes from different water bodies including rivers around Amravati city as well as from some distant places and brought in to market. So different species of fishes were available in fish shops. Fishes were identified by standard scientific method. Photos of fishes are taken and then the asked sellers for few scales of each fish species. The scales are taken from head, middle and tail region. Scales are collected in sample collecting bottles containing 70% alcohol. Sample bottles are labeled as per local name of each fish.

Scales samples were brought to the laboratory of department of Zoology, Sant Gadge Baba Amravati University and their photos were taken. Micrographs were taken by using inverted microscope with an attached camera. Images are directly seen on laptop. On 10X magnification chromatophores were studied.

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III. RESULTS

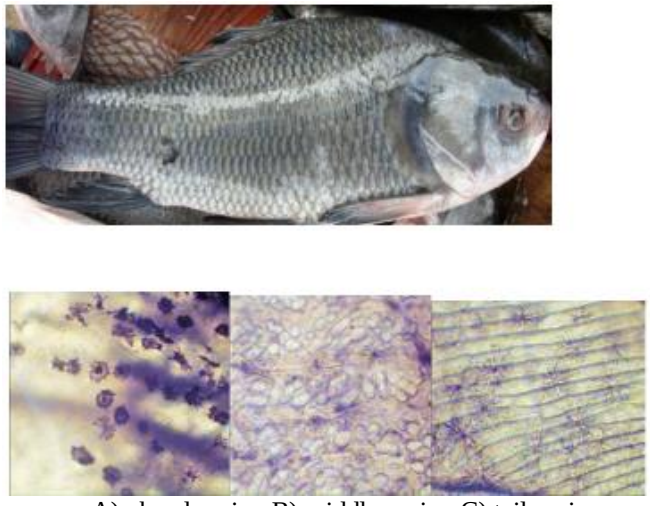
Identified fishes and micrographs of their chromatophores:

1) *Labeo rohita* (Rohu)

A) head region B) middle region C) tail region
Fig.1. Micrographs of scales of Rohu:

In Rohu scale two types of chromatophores were observed, which are melanophores and erythrophores. In head region, erythrophores underlying melanophores are seen. Erythrophores appeared dendritic in shape because pigment granules were spread within cytoplasmic processes. In middle region, erythrophores are abundant and in fully dispersed phase having dendritic shape. In tail region also erythrophores are abundant but pigment granules are less dispersed than in middle region. They are responsible to give red colour to skin.

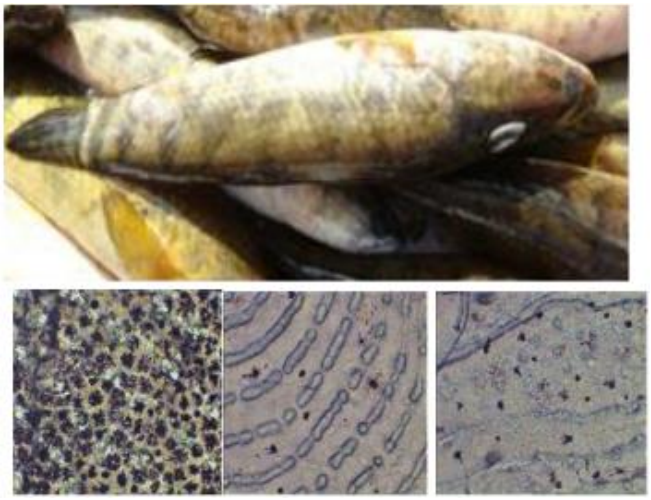
2) *Catla catla* (Catla)



A) head region B) middle region C) tail region
Fig.2. Micrographs of scales of Catla

In Catla scale, most abundant chromatophores are melanophores. In head region pigment granules are moderately dispersed, while in middle and tail region pigment granules were fully spread within cytoplasmic processes giving grayishcolour to skin. But the numbers of melanophores arenot so much to give dark color.

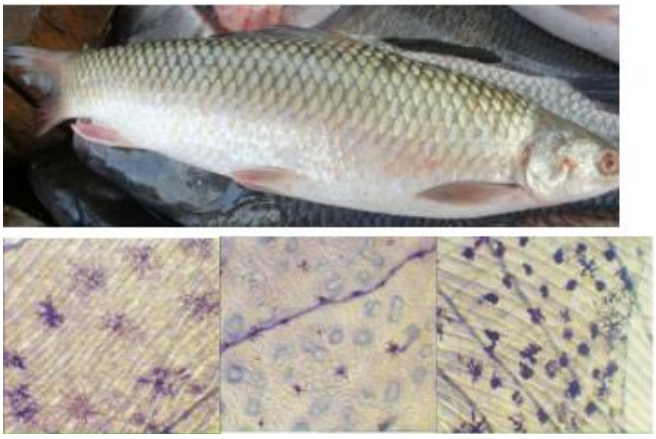
3) *Channa punctatus* (Doke)



A) head region, B) middle region, C) tail region
Fig.3. Micrographs of scales of Doke

In Doke scale, the most abundant chromatophores were melanophores. In head region, melanophores observed in large number and were in fully dispersed phase i.e., pigment granules are spread within cytoplasmic processes giving dentritic shape to melanophores. In middle region and tail melanophores are somewhat in aggregated state and also less in number as compared to head region.

4) *Cirrhinus cirrhosus* (Mrigal)



A) head region, B) middle region, C) tail region
Fig.4. Micrographs of scales of Mrigal

In Mrigal scale mostly melanophores are seen. In head region melanophores are abundant in number and pigment granules were in phase of dispersion. In middle region, moderate number of melanophores had seen in which pigment granules are moderately dispersed. In tail region, numbers of chromatophores are more but pigment granules are aggregated giving oval shape to them.

5) *Channa striata* (Maral)

A) head region, B) middle region, C) tail region.
Fig.5. Micrographs of scales of Maral:

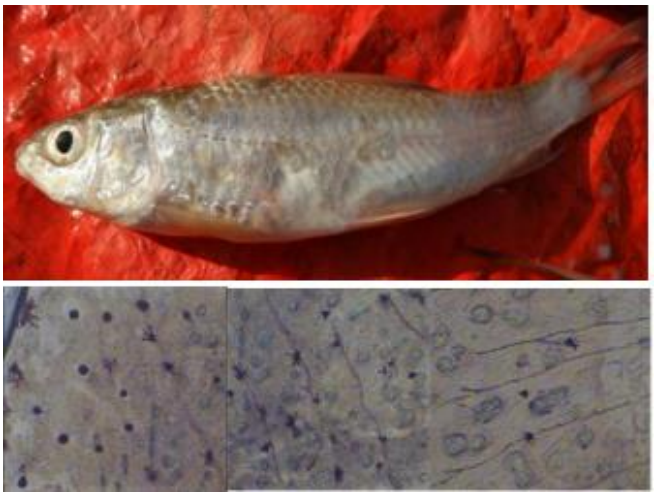
In Maral scale, the most abundant chromatophores are melanophores. In head region, large numbers of melanophores are seen and they had dendritic shape in which pigment granules were spread within cytoplasmic processes. In middle region, numbers of melanophores were more but granules are in phase of aggregation. In tail region, number of melanophores also large and they appeared dendritic in shape. The numbers of melanophores were large enough to give dark colour to skin.

6) Tilapia

A) head region, B) middle region, C) tail region
Fig.6. Micrographs of scales of Murga:

In Murga scale, melanophores are seen. In head region, melanophore granules are in dispersion phase giving dendritic shape. In middle region, pigment granules of some melanophores are in aggregated phase giving oval shape to them and some are in phase of dispersion. In tail region, pigment granules were concentrated in central region of chromatophore giving somewhat round shape.

7) Puntius:



A) head region, B) middle region, C) tail region.
Fig.7. Micrographs of scales of *Puntius*

In *Puntius*, melanophores were seen. In head region, pigment granules are in phase of aggregation giving oval shape to melanophore. In middle and tail region, pigment granules were moderately dispersed still giving star shape to melanophore. In head region numbers of chromatophores are more than in middle and tail region.

IV. DISCUSSION

In the present study, chromatophores of the freshwater fishes from Amravati local market were studied. Seven species scales were used for study. It is observed that, most abundant chromatophores were found are the melanophores. Large numbers of melanophores were seen in *Channa striata* while least numbers were seen in *Puntius.* Chromatophores numbers and shape varies in different species and also in different regions (head, middle and tail) of same species. Densely arranged and dendritic shaped chromatophores observed mainly in head region.

In *Labeo rohita* along with melanophores erythrophores mostly having dendritic shape are also seen responsible for red colouration of skin. *Catla catla*, *Channa punctata*, *Cirrhinus cirrhosus*, *Channa striata* and *Tilapia* scales contains large number of dendritic shaped melanophores. While in *Labeo Rohita* dendritic shaped melanophores observed but, erythrophores having dendritic shaped were the most abundant chromatophores observed in it. In *Puntius* scales, a smaller number of chromatophores was observed and also their pigment granules are moderately dispersed giving light to skin.

V. CONCLUSIONS

By study of chromatophores of freshwater fishes from Amravati local market we can say that, most abundant chromatophores were melanophores. *Catla catla*, *Channa punctata*, *Cirrhinus cirrhosus*, *Channa striata* and *Tilapia* scales contains large number of dendritic shaped melanophores. In *Labeo rohita* along with melanophores erythrophores are also seen. *Puntius* has a smaller number of melanophores and their pigment granules are moderately dispersed giving light coloration to skin. These local fishes show less variation in chromatophores; hence they are not so colorful.

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REFERENCES

[1]. R. Fujii, The regulation of motile activity in fish chromatophores. Pigment Cell Res, 2000, vol.13, pp.300–319.
[2]. R. Fujii, Colouration and Chromatophores. In: ―The Physiology of fishes‖ Eds. Evans, D.H., CRC Press. Boca Raton, FL. 1993, pp. 535-562.
[3]. G. Healey, The skin pattern of young plaice and its rapid modification in response to graded changes in background tint and pattern. J. Fish Biol., 1999, vol.55, pp.937- 971.
[4]. R. Fujii, Cytophysiology of fish chromatophores. International review of cytology, 1993, Vol .143, pp.191-250.
[5]. R. Fujii, "6 Chromatophores and Pigments." *Fish physiology*. Vol. 3. Academic Press, 1969, pp.307-353.
[6]. D. Burton, The Physiology of flatfish chromatophores. Microscopy Research and Technique, 2002, vol. 58, pp.481-487.
[7]. M. Sugimoto, Morphological color changes in fish: regulation of pigment cell density and morphology. Microsc Res Tech. 2002, Vol. 58(6), pp.496-503.