MORPHOMETRIC AND MERISTIC ANALYSIS OF DIFFERENT PARAMETERS OF SCALES OF *CHANNA STRIATA* (BLOCH, 1793)

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ABSTRACT

The present research was carried out to study the basic structure, morphometric measurements and meristic counts of the scales of a Freshwater fish, *Channa striata* (Bloch, 1973). For this purpose, scales of the head region, lateral line, and caudal region were studied under microscope. Results show that *C. striata* has cycloid scales. The head scales lacking the radii (RDS) while lateral line scales and caudal scales have 7-20 and 9-18 radii, respectively. The total length of scale (TLS) was observed as 4.0-8.3mm for head scales, 4.3-6.1mm for lateral line scales and 3.0-5.9mm for caudal scales. The width of scales (WDS) of head, lateral line, and caudal region was examined as 5.0-9.9mm, 3.0-6.1mm and 1.7-4.0mm, respectively. The oval or pear-shaped focus was present at the center of the scale. The distance of the focus from the posterior margin of the scale (Rs) was noted ranging 2.9-6.0mm in head scales, 2.0-4.0mm in lateral line scales and 1.1-3.1mm in caudal scales.

Key words: Cycloid scale, microscopic study, morphometric characters, lateral line scales, *Channa striata*.

INTRODUCTION

Channa striata (commonly known as Striped Snakehead) is a freshwater fish, distributed in Asia from Pakistan to South China. *C. striata* is a potadromous fish which migrates solely in freshwater bodies. Depth range for this species has been testified as 1-10m with common in 1-2m (Froese and Pauly, 2018). Several workers have published their work on different aspects of *C. striata*. Mustafa *et al*. (2012) extracted Albumin and Zinc content from *C. striata* which are helpful to accelerate the process of wound healing in post-surgical patients. Shafri and Abdul Manan (2012) also worked on medicinal aspects of *C. striata.* Qiang *et al*. (2013) had reported isometric growth of *C. striata* from China while Das *et al.* (2015) examined allometric growth of *C. striata* from India. Muthmainnah (2013) had provided a study on the culture of *C. striata* and their suitable stocking rate and feeding management. Dey *et al.* (2014) from India had provided great information on the morphology of scales of genus *Channa* using scanning electron microscopy (SEM). Narejo *et al.* (2015) worked on the breeding biology of *C. striata* and reported July to October as breeding season from Pakistan. Lal *et al.* (2015) examined the morphometric and meristic characters of *C. striata* from Pakistan.

Little work has been published on different aspects of fish scales from Pakistan. Narejo *et al.* (2009) used scales of *Labeo calbasu* for age determination. Masood and Farooq (2011) had worked on different parameters of ctenoid scales in five species of genus *Lutjanus.* Kanwal *et al.* (2015) studied relationships between scale parameters and body size of *Labeo rohita.* Masood *et al.* (2015a, b and c) conducted a comparative survey on morphometric and meristic characteristics of the scales of family Mugilidae and used scale characteristics for identifying their significance in taxonomy. Saddozai *et al.* (2015) studied relationships between total body length and different scale parameters of *Cirrhinus mrigala.* Zahid *et al.* (2015) had worked on Scanning Electron Microscopy (SEM) of scales of *Mugil cephalus* for the first time from Pakistan. Musarrat-ul-Ain *et al.* (2016) studied the significance of fish scales in taxonomy. Musarrat-ul-Ain and Farooq (2016a and b) examined the growth of scales in *Heniochus acuminatus* and *Platycephalids indicus*. Musarrat-ul-Ain and Farooq (2018) explained the general structure of the scale of *Scatophagus argus.* Still, there is a lacuna about the information on morphometric measurements and meristic counts of different parameters of scales of *Channa striata.* Therefore, this study was carried out to fill the gap of information on the basic structure of scale and morphometric and meristic analysis of scales of *C. striata.*

MATERIALS AND METHODS

The samples of Freshwater fish, *Channa striata* was collected from the local fish market at Korangi, Karachi-Pakistan. For the preparation of slides and microscopic study of scales, the methodology followed was that of Musarrat-ul-Ain and Farooq (2018). A total of 141 scales of three body region (head, lateral line, and caudal region) were collected for the study. The basic structure of scales and different measurements and counts of selected scale

parameters were studied under the microscope. The names and abbreviations of selected scale parameters are as follows (Fig. 1):

RDS= Total number of radii on scales
TLS= Total length of scales
WDS= Total width of scales
Rs= Distance of focus from posterior margin of the scale

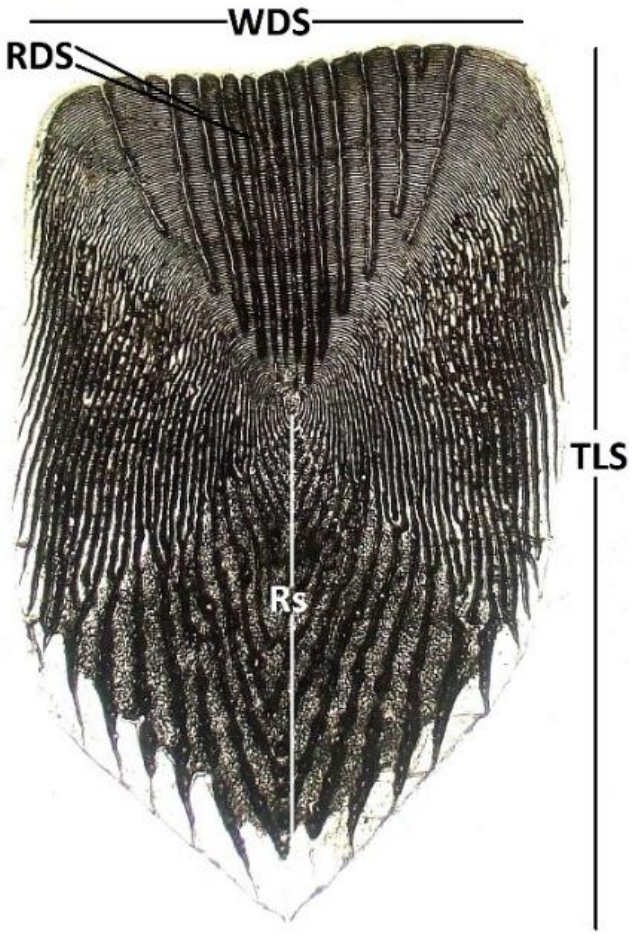

Fig. 1. Showing different parameters of scale.

RESULTS AND DISCUSSION

The results of the microscopic study of scales of the Freshwater fish, *Channa striata* reveal that these scales are cycloid in nature, radii are present only in the anterior field of the scales and focus is oval shaped or pear-shaped and present at the center of the scale (Fig. 2-4). Morphometric measurements and meristic counts of the head scales shows that they lack radii (RDS). The total length of the scale (TLS) varies from 4.0 to 8.3mm and width (WDS) vary from 5.0 to 9.9mm. The distance between focus to the outer posterior margin of the scale (Rs) was observed between 2.9 to 6.0mm (Table 1). Table 2 explains that lateral line scales of *C. striata* contains 7-20 radii (RDS) on the anterior part of the scale. Scale length (TLS) and scale width (WDS) were observed between 4.3-6.1mm and 3.0-

6.1mm respectively. The distance of focus from posterior margin (Rs) was 2.0-4.0mm. The number of radii (RDS) on the scales of caudal region of fish was observed from 9 to 18. The total length of the scales (TLS) was 3.0-5.9mm and width of scales (WDS) was studied, ranging 1.7-4.0mm. The distance of focus from its posterior margin (Rs) was observed as 1.1-3.1mm (Table 3).

Fig. 2. Head scale of *Channa striata*.

Fig. 3. Lateral line scale of *Channa striata*.

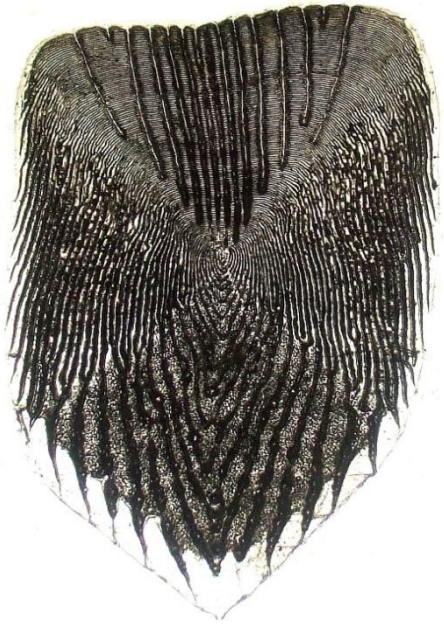

Fig. 4. Caudal scale of *Channa striata*.

Several scientists have reported the basic or detailed structure of scales of different fish species. Esmaeili *et al*. (2007) have reported the cycloid scales of a Cyprinid fish, *Capoeta damascina*. Focus was present near the anterior field of scale and covered with reticulate or honeycomb structures. Few mucous pores were also reported in the

focus region. The posterior margin of the scale contains pigmented granules of different shapes such as round to oval, semi-oval and oblong. They have characterized these scale structures as significant tool in fish identification. Dapar *et al* (2012) have been reported the general structure of scale of *Parupeneus indicus* as ctenii at the posterior field, a focus, a radius, a circuli, a lateral field and an anterior field. Alkaladi *et al.* (2013) had studied the scales of two fishes of Family Sparidae and reported ctenoid scales in *Acanthopagrus bifasciatus* and cycloid scales in *Rhabdosargus sarba.* They had found scale size, radii, circuli and focus as significant characters in fish identification. However, the study on morphometric measurements and meristic counts of scales is still scarce. Studies on this aspect will give more useful taxonomic tools for fish identification.

Table 1. Descriptive statistics of different parameters of head scales of *Channa striata.*

Scale parameters (mm)	Minimum	Maximum	Mean	Std. Deviation
RDS	0	0	0	0
TLS	4.0	8.3	6.376	1.0605
WDS	5.0	9.9	6.816	1.1072
Rs	2.9	6.0	4.153	0.9044

Table 2. Descriptive statistics of different parameters of lateral line scales of *Channa striata.*

Scale parameters (mm)	Minimum	Maximum	Mean	Std. Deviation
RDS	7	20	16.1	2.281
TLS	4.3	6.1	5.538	0.5077
WDS	3.0	6.1	4.721	0.7077
Rs	2.0	4.0	2.975	0.4087

Table 3. Descriptive statistics of different parameters of caudal scales of *Channa striata.*

Scale parameters (mm)	Minimum	Maximum	Mean	Std. Deviation
RDS	9	18	13.38	2.059
TLS	3.0	5.9	4.552	0.6304
WDS	1.7	4.0	2.812	0.4602
Rs	1.1	3.1	2.302	0.4857

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