

THE USE OF SCALES AS A RAPID METHOD OF IDENTIFICATION OF MUGILID SPECIES IN NEGOMBO LAGOON, SRI LANKA

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ABSTRACT

The characteristic features of scales from the dorsal region of ten mugilid species occurring in a Lagoon in Sri Lanka were studied and a key was constructed to rapidly distinguish these species.

Key-words : Mugilid species, Scales Identification

Introduction

In the recent years, various workers have utilized scales to rapidly distinguish and identify various species of fish in aquacultural practices (Zismann, 1981; Chervinski, 1983). It has been known for a long time, however, that scales of fish can be employed at least to some extent in the classification of fish (Brown, 1957).

In taxonomic studies, only cycloid and ctenoid scales have been utilized to any extent for diagnostic descriptions of living fishes. The main characteristics of scales utilized in taxonomic studies have been the circuli (the surface ridges), radii (grooves in the bony layer) and the ctenii, the tooth-like structures found in the posterior field of the ctenoid scale. The position of the focus or centre of the scale with respect to its proximity to the various margins, the shape of the scale, the presence or absence of prominent marginal lobes, scallops or deep serrations on the scales may also have a value in a systematic study. Degenerated scales, however, have not been suitable for this purpose (Brown, 1957).

It is known that there are about ten species of mugilid fish in Negombo Lagoon and some of them are of aquacultural importance (Wijeyaratne, 1984). So far, these fish have been identified using laborious keys. The present work is an attempt to see whether these mugilid species could be distinguished on the basis of differences in the structure of scales.

The species known to be present in Negombo Lagoon are as follows :

1. *Mugil cephalus* (Linnaeus) – Grey mullet.
2. *Mugil kelaartii* (Gunther) – Kelaart's mullet.
3. *Valamugil buchanani* (Bleeker) – Buchanan's blue tail mullet.
4. *Valamugil seheli* (Forskul) – Blue spot mullet.
5. *Liza strongylocephalus* (Richardson) – Round head mullet.
6. *Liza dussumieri* (Valenciennes) – Dussumier's mullet.
7. *Liza macrolepis* (Smith) – Borneo mullet.
8. *Liza tade* (Forskul) – Green-back mullet.
9. *Liza waigiensis* (Quoy and Gaimard) – Diamond-Scale mullet.
10. *Liza ceramensis* (Bleeker) – Ceram mullet.

Materials and Methods

The species of mugilids collected from the Negombo Lagoon were separated into different species using the diagnostic characters and the key given by Munro (1955). Their lengths were subsequently measured. They were then labelled and preserved in 10% formalin. In the laboratory, scales from dorsal, ventral, pectoral and the caudal regions of all specimens were studied observing initially with the naked eye and then under the light microscope.

The following characters of the scales of each species were then observed and recorded.

- i. Shape of the scale: This includes the height and the breadth of the scales.
- ii. The shape of the anterior margin of the scales.
- iii. The distribution pattern of the circuli.
- iv. The distribution pattern of the radii.
- v. The detailed structure of the posterior region.

Subsequently, the common features of scales of each species were identified and recorded.

In this study degenerated scales were not taken into consideration when making these observations.

Results and Discussion

The results indicated that only scales from the dorsal region could be best utilized for distinguishing the different species of mugilid fish.

Using the morphological features of the scales, the following key was constructed to distinguish the mugilid species in Negombo Lagoon (Fig. 1(a) to (j)).

1. Height of the scale is distinctly greater than the breadth (breadth is smaller than the height) (2)

Height of the scale is similar or slightly greater than the breadth (breadth of the scale is slightly greater than the height) (3)
2. Anterior region of the scale is wider than the posterior region *Liza tade* (Fig. 1(i))

Posterior and anterior regions are similar in size. *Liza dussumieri* (Fig. 1(h))
3. Several rows of ctenii present in the posterior region (4)

Only one row of ctenii in the posterior margin (6)

No ctenii and the posterior margin is clearly irregular
 . . . *Nalamugil seheli* (Fig. 1(b))
4. The border between the anterior and the posterior regions is nearly straight
 *Mugil cephalus* (Fig. 1(f))

The border between the anterior and the posterior regions of the scale is not straight (5)
5. Scale is pentagonal *Liza waigiensis* (Fig. 1(d))

Scale with four sides; the posterior margin is much curved (6)

6. The sides of the scales are nearly straight *Liza ceramensis* (Fig. 1(j))
 The sides of the scales are slightly curved *Liza macrolepis*
 (Fig. 1(c))
7. A prominent notch at the middle of the anterior margin of the scale (the sides of
 the scales are distinctly curved) *Liza strongylocephalus*
 (Fig. 1(g))
 An indistinct notch present or sometimes without a notch at the middle of the
 anterior margin (the sides of the scales are not distinctly curved) (7)
8. Prominent marginal lobes along the anterior margin *Valamugil*
buchanani (Fig. 1(e))
 Distinct marginal lobes only at the middle of the anterior margin
Mugil kelaartii (Fig. 1(a))

This study indicated that the scales of the dorsal region could be utilized for the identification of mugilid fish species in the Negombo lagoon. Scales of the dorsal region are uniform and the features of the scales are common to all the scales of the dorsal region.

In the scales of ventral, pectoral or caudal regions of fish, those identifying features are not uniform and the characteristic features, even if present, are not common to all the scales of each region. Therefore, in the construction of a key for the identification of any mugilid species, it is suggested that only the scales of the dorsal region should be used and in every instance more than one scale should be utilized.

Identification of fish species using scales as in this instance has many advantages. It can be utilized to identify

1. the species of small fish among mugilids.
2. the species of fish which have lost their body parts.

A fish without its fins, maxillae or other parts of the body cannot be identified using the key provided by Munro (1955). In such situations, the species of fish can be identified utilizing this key based on the structure of scales.

This key can also be utilized when the lateral scales cannot be distinctly counted as this is an important feature on which Munro (1955) based his key.

This key can also be utilized in studying predator-prey relationships and also in aquacultural practices.

Summary

Ten species of mugilids occur in the Negombo Lagoon, Sri Lanka. Using characteristic features of scales from the dorsal region such as the shape of the scales, the distribution pattern of the circuli and radii and the structure of the posterior region of scales, a key was constructed to rapidly distinguish the species of mugilid fish.

This key could be advantageously utilized to identify mugilid fish when only parts of those fish are available.

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