

Three Point Sampling Scales Chaetodontidae Method (TPSSCM) For Coral Reef Fishes Chaetodontidae Family

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Abstract - Coral reef fishes Chaetodontidae family have characteristic scales and linea lateralis position. This coral reef fishes family unique and have some color and specific as ornamental salt water fishes. This article aims to describe scales different point: dorsal point, linea lateralis point and ventral point are different. The scales sampling taken according *Three Point Sampling Scales Chaetodontidae Method* (TPSSCM). They are as reasons for new technic sampling. Until now, no research about scales of Coral Reef Fishes Chaetodontidae. The result of the research showed microstructure scales dorsal point, linea lateralis point and ventral point are different. Different component scales at dorsal point, linea lateralis point and ventral point are indicate scales of Coral Reef Fishes Chaetodontidae specific and unique if we are going compare to another scales fishes consumption or scales of freshwater fishes. Conclusion, *Three Point Sampling Scales Chaetodontidae Method* (TPSSCM) can indicated different position of scales are different morphology or shape of scale elements.

Keywords - Coral reef fishes, Chaetodontidae, scale, *Three Point Sampling Scales Chaetodontidae Method* (TPSSCM).

I. INTRODUCTION

One of the unique features in a fish is the presence of the scales. The scales cover body fishes and lie on the outer surface of the body. Various types of scales are found in fish's example: cycloid, ganoid, cosmoid or ctenoid and placoid. Placoid scales are found in cartilaginous fishes and rest all are found in bony fishes. These are derived from the epidermis of body fish.

Many of fishes have a covering of scales, which can be divided into some variation of types, over the outersurface of their bodies. These types there are : the plate-like placoid scales of sharks; the diamond shaped ganoid scales of the gars; the thin, smooth, disk-like cycloid scales of most freshwater fish and many marine species; and the ctenoid scales (with ctenii—small projections along the posterior margins) of perches and sunfish [1].

All the species presented scales in this atlas are preferable to the cycloid and ctenoid types. Distinguishable scale characteristics include (1) overall scale shape; (2) position and shape of focus; (3) circuli appearance; (4) the

appearance of the lateral, anterior, and posterior fields; and to some extent, thickness/robustness of the scale. As there is considerable variation in scale shape even between different areas of the same individual fish, scale outline is not always the best indicator for identification [2].

Size is also generally not a desirable characteristic. Scale size varies and overlap occurs not only between species and individuals, but also within a single specimen.

The scales of bony fishes are derived entirely from the dermal layer of the skin and overlap one another like the tiles. The overlapping (imbrications) of the scale is important in the sense that it imparts mechanical support. Each scale is shaped roughly like a human finger nail whose front end is inserted deep into the dermal layer, while the hinder end is free of exposed and bears the pigment cells or chromatophores on it. These chromatophores provide specific color to the fish body.

SEM studies for scales today important to understand microstructure of scales fish. Many benefit to know about microstructure of scales of fishes. To study the impact on

the hard parts of fish, scales were took with tweezers from the second row, above the lateral line and directly under the anterior rays of the dorsal fin [3]

Chaetodontidae fish's family have characteristic scales and linea lateralis position. This fishes family unique and have some color and specific as ornamental salt water fishes. This article aims to describe scales different point according *Three Point Sampling Scales Chaetodontidae Method* (TPSSCM). They are as reasons for new sampling scales. [3] Only two point scales sampling, another scales

researcher like [4] eight area of the body.

Scales are usually divided into four parts: rostral, caudal, ventral, and dorsal fields, with the last two forming the lower and the upper lateral parts, respectively. In some species, the parts of the scale vary greatly depending on the relative size of the fish and the body region from where the scales were taken. Scales imbricate each other and, consequently, only the caudal field is exposed and visible on the surface, while the rostral field lies embedded in the dermis [4].

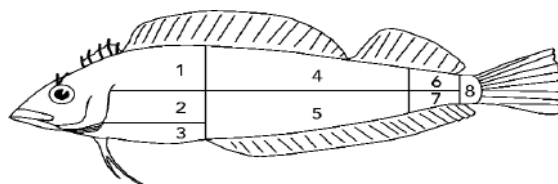


Figure 1. Eight are of the body for took scales [4].

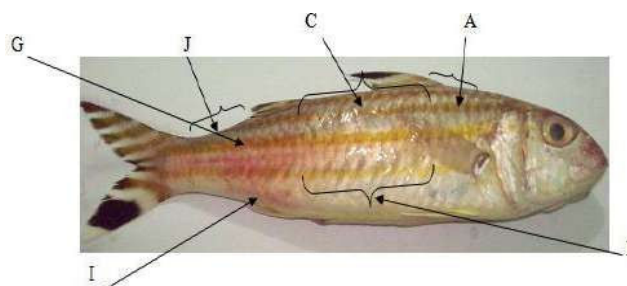


Figure 2. Six region for took scales of fish *Uppeneus* spp head region, (C) scales from the dorso- lateral line, (E) scales from the ventral-lateral line, (G) scales on the posterior above the dorso- lateral line, (I) scales below the ventral lateral line posteriorly located (480dpi) [8].

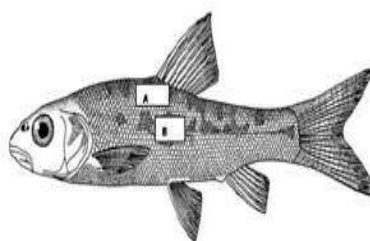


Figure 3. Schematic drawing of *Capoeta damascina* (total length, 45cm) showing location of key scales using for scanning electron microscopy. a) Scale below dorsal fin; b) lateral line scale [3].

II. MATERIALS AND METHODS

The Method use in this research for took sampling scales are *Three Point Sampling Scales Chaetodontidae Method* (TPSSCM)

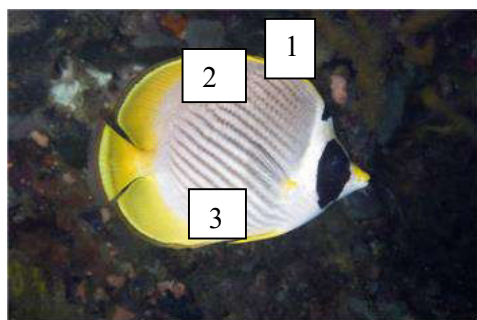


Figure 4. *Three Point Sampling Scales Chaetodontidae Method (TPSSCM)*

Locations The study sites were Jakarta, Padang City, and Pesisir Selatan District. Samples of object fish scales Chaetodontidae from Pelabuhan Ratu (Sukabumi, West Java) Jakarta, Tangerang and Sungai Penuh (Lake Ranau Kerinci) Semah fish dan Belida fish came from the Musi River in Palembang City.

2.1. Materials and Tools

2.1.1. Materials

The fish that are the object of research are Chaetodontidae. The number of fish species observed were 3 types of scales Chaetodontidae and two types of Bilih fish (Bilih fish in Lake Singkarak and Lake Toba). Semah fish in Lake Ranau Kerinci and Musi River in Palembang. Object fish scales, Sterile Aquades, Ethanol 30%, 50%, 70% and 90%. Rolled tissue, organic coloring material, glass objects, glass covers, fish cooler boxes, rollers, digital cameras, clippers and 100-scale storage bottles.

2.1.2. Tools

The tools needed are SEM, surgical instruments, loop, rollers, digital cameras, ordinary clippers and digital clippers and digital cameras.

2.2 Procedure

2.2.1. Sampling The Scales

The method used in this study is the *Three Point Sampling Scales Chaetodontidae Method (TPSSCM)*.

2.2.2. Drying Fish Scales Fish

The scales are taken using tweezers from the body between the lower dorsal fin and *lateral linea* (lateral line)

and also from *linear lateral*. After that it is cleaned with a soft brush and rinsed three times with Sterile Aquades. Fins that have been cleaned are put into 30, 50, 70 and 90% ethanol. Then dried using filter paper. To prevent shrinkage after 70% Ethanol, fins are placed between *Microslides* for two or three days [4].

2.2.3. Observation of fish scales using Electron Microscopes (SEM)

The scales of dried fish are observed using Scanning Electron Microscopes (SEM). SEM is used with magnifications of 5000-15000 times according to the quality of the observations. The observed variables were the micro surface structure of the object fish scales, the two-dimensional size of the object fish scales, the shape of the lepidont, the method analysis and the analysis of the object fish lepidont identification tools.

III. RESULT AND DISCUSSION

From observation and measurement scale with camera microscope and SEM, we get some figure of scales from dorsal point, linea lateralis point and ventral point. We can show below figure 4, 5 and six according position scales of *Chaetodon falcula*.

3.1. Dorsal point



Figure 4. *Chaetodon falcula* (A.Razak Collection)

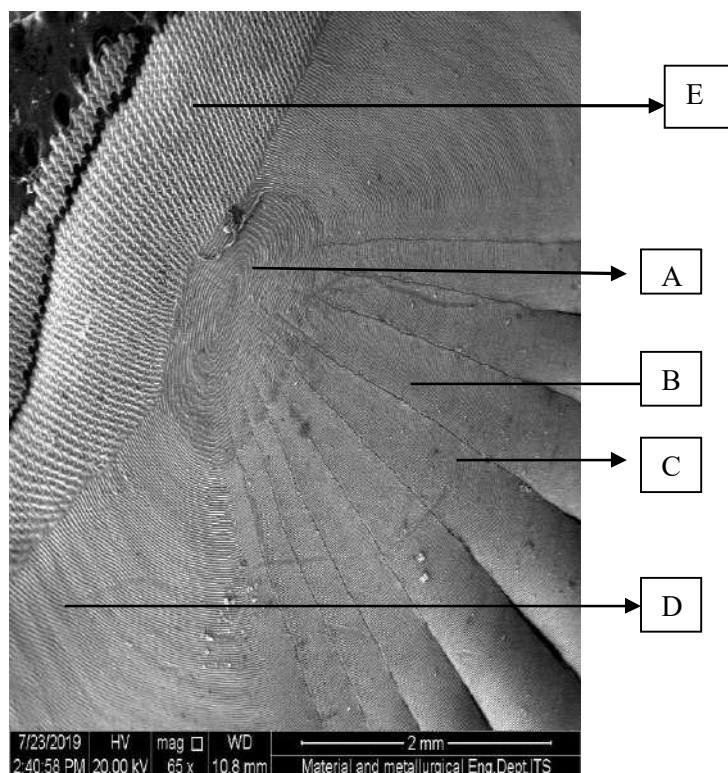


Figure 5. Dorsal scale and elements: A. *Focus*, B. *Radii*, C. *Inter Radial Area*, D. *Lateral field*, E. *Ctenii*, (Zoom 65x) [8].

3.2. Linea Lateralis Point

The scale from linea lateralis point is different with dorsal point (see Figure 5 and Fig.6).

The scale from linea lateralis point is different, dorsal

point and ventral point are different (see figure 5, 6 and 7). This is new fact about scales of Coral Reef Fishes Chaetodontidae family. Recapitulation characteristics of scales of Coral Reef Fishes Chaetodontidae family see Table 1.

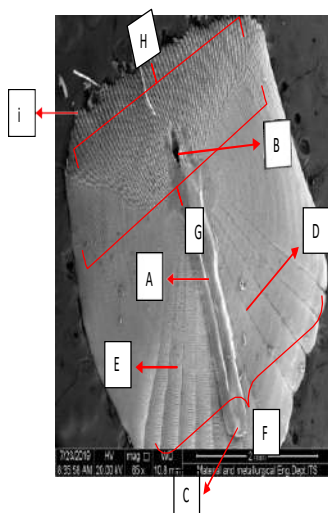


Figure 6. A. *Lateral line canal*, B. *Posterior opening*, C. *Anterior opening*, D. *Radii*, E. *InterRadial Area*, F. *Anterior field*, G. *Lateral field*, H. *Posterior field*, I. *Ctenii*. (Zoom 65x) [8].(Dufa, 2019).

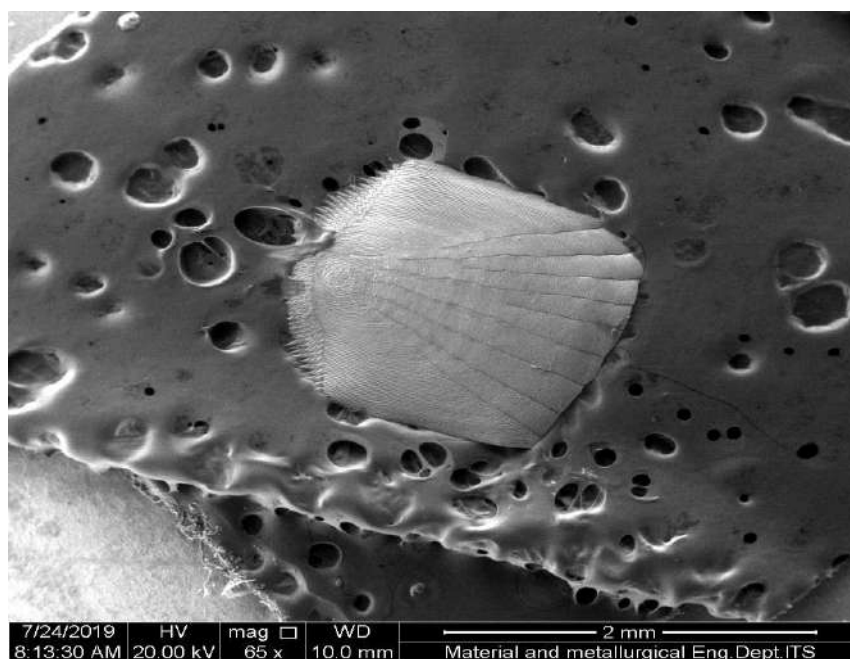


Figure 7. Ventral scale and elements: A. *Focus*, B. *Radii*, C. *Inter Radial Area*, D. *Lateral field*, E. *Anterior field*, F. *Posterior field*, G. *Ctenii*, H. *Circuli*, I. *Primary radii*. (Zoom 65x).

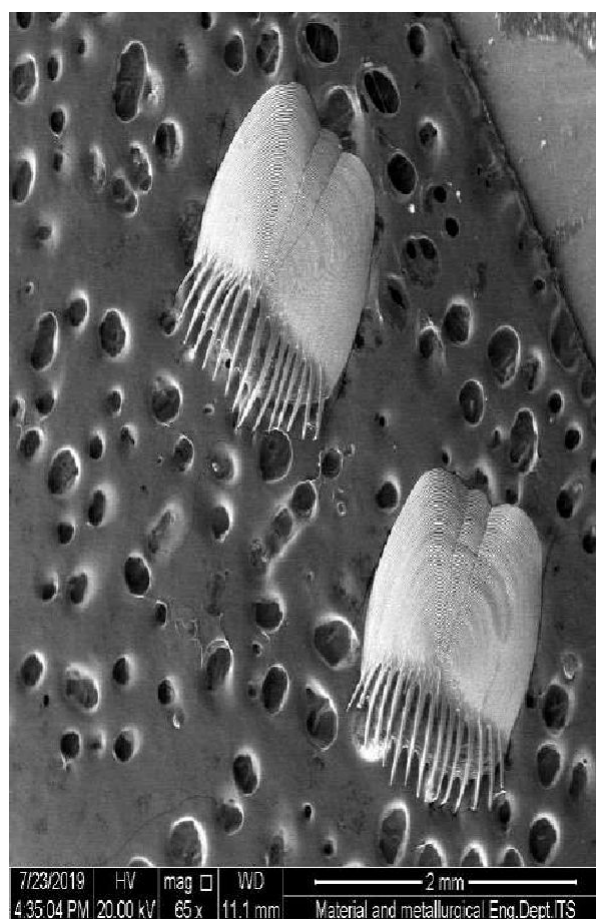


Figure 8. Ventral scale and elements:

- A. Focus absent, B. Radii, C. Inter
B. Radial Area, D. Lateral field, E.
C. Anterior field, F. Posterior field, G.
D. Ctenii, H. Circuli, I. Primary radii.
E. (Zoom 65x)

Table1 1. Microstructure scales *Chaetodon falcula* Bloch, 1795 on at below dorsal, point, *linea lateralis* point and ventral point (modification Dupa, 2019).

	Scale at below Dorsal Point	Scale at Linea Lateralis point	Scale at Ventral point
Focus	√	x	Yes or No
Ctenii	√	√	√
Radii	√	√	√
Inter Radial Area	√	√	√
Circuli	√	√	√
Intercircular space	√	√	√
Lateral line canal	x	√	√
Anterior opening	x	√	√
Posterior opening	x	√	√
Lepidont	√	√	√
Primary radii	√	√	√
Scale type	Ctenoid	Ctenoid	Ctenoid
Bentuk focus	Oval	x	
Focus position	oward caudal point right	x	Toward caudal point left or absent
Bentuk Lepidont	small/truncate	Lenght/sh arp	Lenght/sharp
Type of body scale	Pentagonal	Pentagona l	Pentagonal
Lepidont Distance	Crowded	Crowded	Crowded

IV. RESULT AND DISCUSSION

According [6] Louis Agassiz who classified the scale of Chaetodons fishes as Les Ctenoides scale. He have been classified fishes on the basis of four scale types: having thin plates with smooth borders. Although this classification

was not clear and unnatural, the nomenclature introduced by Agassiz has been fully incorporated into ichthyology. Today we found five basic types of scales (placoid,cosmoid, ganoid, cycloid and ctenoid) are recognized. However, including all scales with spines on their posterior margins under the term ctenoid is an over

simplification of the situation.

V. CONCLUSION

Three Point Sampling Scales Chaetodontidae Method (TPSSCM) can indicated different position of scales are different morphology or shape of scale element. This is new method for research of scales of Coral Reef Fishes Chaetodontidae family.

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