The Study of Morphometric and Meristic of Yellow Tail Fish Landed in Nusantara Fishery Harbour of Sungailiat, Bangka Regency

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Abstract. Caesionidae is one of the first commodity from a kind of varieties fishes in Nusantara Fishery Harbour (PPN) at Sungailiat, Bangka Regency. Caesionidae is consumption fish and become important food source for human. People call this fish as Yellow tail fish because it has yellow tail and the upper body of this fish is dominate by yellow colour. In scientific name, this fish named as caesiocuning. On local name, yellow tail fish named “delah”. This research aims to analyze the character of morphometric and meristic of yellow tail fish in PPN Sungailiat, Bangka Regency on December 2018 to januari 2019. The data was taken using random sampling method. This research takes 23 morphometric and 9 meristic parameters. The character of morphometric showed that the yellow fish tail has Total Length body 12-18.3 cm. The characters of meristic of Yellow tail fusilier in PPN Sungailiat Bangka Regency showed has the formula of Dorsal Rays, Anal Rays, Pectoral Rays, Ventral Rays, and Caudal Rays in order are D.IX 15-D.X 15, A.III 9-A.III 11, P.18, V.19-V.20, and C.18-C.22. The final result of classification show that the name fish in PPN Sungailiat (Bangka Regency), is Lutjanus vitta (Lutjanidae).

1. Introduction
In Indonesia, demersal fish resources allegedly is one of the most abundant fishery resources and most were caught for consumption by Indonesian society after small pelagic fish. Demersal fish generally live in the seabed and serves as a consumer in the food chain[1]. One of many province that has the big potential and the abundance of fishery resources is the province of Bangka Belitung. The length of coastal areas in the province made the abundance of a fish landing site either in the form of a harbour on both of the island. But the big port was run by the Central Government i.e. Nusantara fishery harbour, each of the two major islands have one Nusantara Fishery Harbour (PPN). One of them is located in Sungailiat (Bangka) and the other is located in Tanjung Pandan (Belitung)[2].

The fishery resources that landed in Nusantara Fishery Harbour (PPN) Of Sungailiat is various enough, such as mackerel Fish, yellow fusilier, and another types of other profitable commodities being the main fish that caught. Based on the statistics of the Ministry of fisheries and marine affairs, the fish catch in the province of Bangka Belitung Islands with a volume above 5000 tons per year are mackarel fish, anchovy, tuna fish, curry, komo mackarel tuna, rastrelliger and yellow tail fish. Yellow Tail fish is one of the species from the family of Caesionidae. This fish has the important economic value towards the society. The types of fish from Caesionidae are characterized by its striking colour, most have yellow...
stripes. In addition, they also form the hordes[3]. According to Carpenter (1988)[4], family of Caesionidae is a member of the order Perciformes that live in marine waters and their are only found in tropical waters of the Indo-Pacific[5].

In Bangka Belitung, when we looking for yellow tail fish people will give us the fish like the sample of this research but, on the literature, it is different. We assumed as the hypothesis that the fish that called as ” yellow tail fish “ by local people is different with yellow tail fish in national name. Raises doubts about the truth of the name of a fish species. That’s why this research conducted with the aim answer the urgention of the misconception from the species using morphometric and meristic to identify the type of the species of the yellow tail fish landed in the Nusantara Fishery Harbour (PPN) of Sungailiat, Bangka Regency.

2. Methodology

2.1 Place and Time
This research was implemented starting from December of 2018 to January of 2019 at fishing port Nusantara (PPN) Sungailiat of Bangka Regency. Measurement of morphometric and meristic characterize of the fish conducted in the laboratory of faculty of Agriculture, Fishery and Biologi, University of Bangka Belitung.

2.2. Tools and Materials
The tools and materials used in this study consists of a plastic camera, sample, paper labels, tray, sterofoam, tweezers, caliper, 4% formalin, samples of fish, and the identification book.

2.3 Method
This research uses purposive sampling method, and it was conducted descriptively by digging the data in field. Observation is a method that is made to the observations directly into the filed about how to identify fish[6]. Fish samples taken from some fishermen for further measurements of meristic and morfometric parameters in the fishery laboratory, FPPB UBB. Most specimens were photographed when fresh.

2.4. Analysis of Morfometric and Meristic
Morphometric Analysis is concerned with the study of variation and change form (size and shape) of an organism or object covers the measurement of the length and the analysis of the quantitative framework. The identification of meristic is the calculation of a specific part on the body of the fish, for example, include the number of scales on the side streaks (linea lateralis), the amount of hard and soft the fin rays, and number of transverse body scales. Measurement and calculation of the morphometric and meristic character fish refers to research Haryono in 2001[7], seen on Figure 1.

3. Result and Discussion

3.1 Morphometric Characterize of Yellow Tail Fish
Total sample of yellow tail Fish that is examined is 20 fish. The fish into the sample identified the characters morfometrik (23 characters). The results of the measurement and calculation of the character morfometrik character meristic seen on Table 1.
In some research on the different capture tool, Yellow Tail Fish that first caught have varied sizes. According to research Indarsyah[8] known Fish yellow tail in the Seribu Archipelago Waters catched using netted muroami has length with first caught on the size 15.0 cm; While the catch fishing line on the size of 12.5 cm. According to Bloch in Naranji et.al, 2018) [9] in the research of Yellow Tail Fish Bloch, who first caught on and became a research sample of Bloch has a size of ripe gonads 19 cm. The age of Fish worth catching fish from outside shall be ripe gonads. The maturity of the gonads fishes can be seen from the size of the fish. Mature gonads patterns in fish vary on the size of the fish. Caesionidae females that are in the waters of Seribu Archipelago have gonads mature size on size 22.92 cm[8].

There are 23 morphometric character of Yellow Tail Fish (table 1). The table presents the results of the measurement range of the character morfometrik which became the sample of the study. According to statement Peristiwady[10], yellow tail fish have relatively high body, somewhat elongate,
and somewhat flattened. Right at the top of the eye, curved head somewhat concave. The mouth is small and there is little teeth on the jaws, vomer bone, and bone of the palatine. The front of the jaw have teeth-shaped fangs. The upper body is blue to blackish, while the lower part colored bluish white. The pectoral fins and fin a reddish-colored belly, Caesio cuning is the most tolerant of murky waters; typically found in most abundant coral areas with underwater visibility is low. This species is widespread on a coral reef areas up to depth square 60 m[4].

Total length (TL) of Yellow Tail Fish specimens that landed in Nusantara Fishery Harbour of Sungailiat, Bangka Regency ranging between 12-18.3 cm with an average 14.995 cm, In contrast to the Yellow Tail Fish in the waters of Makassar, Nirmalasari (2016) [11] reported the range 21-36 cm in length with an average total length of 25.6 cm for males and 19-32 cm for the female fish as well as average total length of 25.1 cm. According to Iwatsuki statement [12], fish of the family lutjanidae has long range standard 7.5 – 26 cm depending on the particular species. This research has a similarity result with Saha research (2018) in Bangladesh for yellow tail fish (family lutjanidae) especially morfometric and meristic parameters [13]. In this study, not differentiated between males and females

Standard length (SL) is a body length from the tip of the head up to the base of the tail fin. The standard length of Yellow Tail Fish landed in Nusantara Fishery Harbour of Sungailiat, Bangka Regency based on table 1. Have a range of 9.6-15, 5 cm with an average of 12.745 cm. The difference average of total length (TL) and a standard length (SL) is 2.25 cm (3:1). This shows the difference in the length of the Fish body parts yellow tail fish from the base of the tail to the tip of the tail), this research according to Saha Research [13]. Table 1. Indicates that the length of the base of the Tail (CPL) have a range of 1.3-2.1 cm, the length of the upper tail fin (LUL) have a range of 2.1 to 3 cm, and the length of the lower part of the tail fin (LCLL) have a range of 2.1-3.1 cm with an average over 2.475 cm and 2.555 cm. Therefore, if the combined length of the tail section Caesioidae include the length of the base of the tail and fin length of the top and bottom have a mean 4.9 cm[11]. Body Depth (BD) of Yellow Fish Tail landed in Nusantara Fishery Harbour (PPN) of Sungailiat, Bangka Regency ranging from 3.5 – 6.5 cm with the average 5.0345 cm. The comparison of the body depth (BD) mean with the total length (TL) shows the result 5.035 cm opposed 14.995 cm.

The Morphometric parameter of yellow tail fish fins landed in Nusantara Fishery Harbour (PPN) of Sungailiat Bangka Regency is composed from 5 parameters include, namely the dorsal fin (Pinna dorsalis), belly fins (Pinna ventralis), pectoral fins (Pinna pektoralis), tail fins and anal fins (Pinna analis). Fish Body consists of three parts namely the Caput (head), Truncus (the body), and Caudal (tail section). Fin fish with the longest average is the dorsal fin (Pinna dorsalis) with an average length of 20 samples is 6.745 cm followed pectoral fins (Pinna pektoralis) with average 3.090 cm while the shortest is belly fins (Pinna ventralis) with an average amounted to 1.165 cm. The dorsal fin elongated yellow at the fish back to the other end of the base of the tail. Yellow tail fish has no adipose fins or additional fins that appears at the end of the base of the tail.

Caudal Fins, the upper of the caudal and the posterior back is yellow. The upper body, is not yellow but greyish blue. The down side of the body and the belly is white or pink. Belly fin, pectoral fins, anal fins are white to pink. The base of the pectoral fins are black; part posterior to the dorsal fin is yellow and the anterior portion of blue grayish [4].

3.2. Meristic Character of Yellow Tail Fish

The characteristics of Meristic of Yellow Tail Fish that have been identified from 20 have 9 characters. Meristic characters related to the counting of the number of fish body parts[14]. The results of the measurement and calculation of the meristic character seen on Table 2.

Yellow tail fish has an elongated body shape, wide and flat. The two canines in the lower jaw and smooth on the palate. 10 hard rays and 15 soft rays on the dorsal fin. Three hard rays and 11 soft rays on the anal fins. These fish have thin scales and there are 52-58 on the line of her ribs. The rough scales on the top and bottom lines of the ribs and arranged horizontally, the scales on the head start from the eye. According to Allen et al. (2007)[6], the body of yellow tail fish is flattened-shaped, or have a bulge post maxillary. Teeth small cone-shaped as in the jaws, vomer, and palatine yellow tail fish can reach
lengths of up to 50 cm. yellow tail Fish usually form a large and schooling and can be found at the depths of 1-60 meters.

Table 2. Meristic Parameters

| No | Code | Measurement      | Result                     |
|----|------|------------------|----------------------------|
| 1  | DR   | Dorsal Rays      | D. IX 15 – D. X 15         |
| 2  | AR   | Anal Rays        | A.III 9– A.III 11          |
| 3  | PR   | Pectoral Rays    | P. 18                      |
| 4  | VR   | Ventral Rays     | V.19 – V. 20               |
| 5  | CR   | Caudal Rays      | C. 18 – C.22               |
| 6  | LL   | Linea Lateralis  | 44 – 56                    |
| 7  | CPS  | Caudal Peduncle Scale | 10 – 12               |
| 8  | TS   | Transverse Scale | 11-23                      |
| 9  | PS   | Predorsal Scale  | 18-23                      |

Each fin is composed by the "membrane", which is a membrane consisting of soft tissue, and "radialia" or "spokes" consisting of fin tissue of bone or cartilage. Radialia is a branched and some are not, depending on the type. The dorsal fin (Dorsal Rays) consists of hard and soft rays. Yellow tail fish landed in Nusantara Fishery Harbour (PPN) of Sungailiat, Bangka Regency has a dorsal fin with the formula D. IX 15 – D. X 15. Meaning thing, there is a sample that has hard rays in the dorsal fin as much as 9 - 10 and 15 is the soft rays. According to Carpenter [4], the Yellow tail fish in general has dorsal rays with 10 hard rays and 15 (rarely 14 or 16) soft rays. Based on the research results, the anal rays of yellow tail fish is A.III 10-11 and Pectoral Rays is P.18. According Carpenter [4], Yellow fish tail has the anal Rays with 3 hard rays and 11 (rarely 10 or 12) soft rays and pectoral rays with 18 or 19 (rarely 17 or 20) rays.

Whole body of fish generally have scales (squama). Scales called dermal skeleton, also associated with the outer frame (exoskeleton). Scales or squama form order out especially on the primitive fish, for example on a fish tangkur horse [13] which have scales very hard.

Scales become one of the parameter for the meristic in this research. The amount of the scale in linea lateralis of yellow fish tail is 44 – 56 scales, Transverse scale 11- 23 scales, pre dorsal scales 18 - 23 scales and caudal preduncle scales 10 - 12 scales. According to Carpenter [4], the amount of linea lateralis scale is 45-51 (generally 49), scales the top stem tail usually 9 or 10 rows, whereas the bottom 13 or 14 rows. The scales on the top of the line the sides and in front of the dorsal fin is usually 8 or 9 line, while 14 of the bottom line the sides and in front of anal fin 15 – 17 rows. There are scales on the cheek 4 or 5 lines of predorsal scales, usually 21 to 25. The difference in the number of scales can be affected by fish growth factor of the fish it self.

3.3. Yellow Fish Tail Identification

Based on the measurement of Morphometric and meristic obtained the data of the characters that represents the spesies to see the fish is included in the spesies that represented. According to William statement[16],ordo Perciformes has more than 10 family and including Caesionidae and Lutjanidae. Caesionidae have characterized the teensey teeth, small mouth, and a very straight and upright fin, while large mouth have Lutjanidae and jaw with distinct canines as well as tail fins erect. Based on observations of the character of morphometric, the fin of the fish was being shaped upright so that the fish can be entered into the family Lutjanidae

Family of Lutjanidae has 4 sub family, 18 genus and more than 100 species[17]. Genus is determined towards the meristic character. The character of meristic of yellow fish tali landed in Nusantara Fishery harbour (PPN) of Sungailiat, Bangka regency has dorsal Rays DX.15-DXI.15. according to FAO[17], the range of the dorsal rays like mentioned before show the fish was including in genus Pinjalo or Lutjanus. The genus of Pinjalo has the characteristic has the pattern of horizontal line extends from the eye to the base of the tail, which is based on the morphology of Yellow Tail Fish
being sampled, then this yellow tail fish belonging to the Genus Lutjanus[17]. According to the Saanin[18] in the genus lutjanus have characterized or Lutjanus his big mouth, keeping lid notched tail fins and gills upright supporting evidence that yellow tail Fish landed in PPN of Sungailiat, Bangka Regency entered into the genus Lutjanus. \textit{Lutjanus sp} has more than 100 kinds of species are distributed in Indo-Pacific waters to the Atlantic Ocean.

The identification using the determination key for the fish from the \textit{Lutjanus sp} that landed in the indo-pacific ocean used the determination key of FAO. Based on Saanin statement [18], The fish from this genus has the hard rays on dorsal rays with the range 9-11 also followed with the black pattern from the eye to the caudal fin is including to \textit{Lutjanus viitata}. The determination key of FAO shows the order of the point of he determination key seen from the width from the eyes can reach 3 to 8 times smaller with the head length, so does the eyes width that the amount can be 4 times smaller than the head length. Other parameter is this species has the dorsal rays with 9-12 hard rays and 13 soft rays or more, anal rays with 3 hard rays and 7-11 soft rays. The colour from this species is pale and dominate with yellow.

The division of other species is seen from there is not sign black patches on the body of the fish. A fish that has a black patches or black spots are classified into species of \textit{Lutjanus ruselli} with patches to the tail section, but if the patches only up to the base of the tail is black, then a trailing be classified to the species \textit{Lutjanus fulvillama}. Yellow tail fish that became the sample of this research have a lateral line or midline darker brownish black extends along the body to the base of the tail. There is no black spots or black patches round pattern forming the sign over the body of the fish into the sample research. The body color is white with reddish color dominated the fin with yellow. Fish with such characteristics included in the species of \textit{Lutjanus viitata} [17]. The body color is pale brown to pink, with narrow dark midline in addition, brownish line followed the faint line of the scales on the sides and it has a row of scales sticking out above teeth fillings, sides extends to the middle of the back.

\textit{Lutjanus viitata} is one of the demersal fish living in coral reef area in a group or with a basic flat waters at a depth of 10 - 100 meters[19]. Based on research Edrus[20], demersal fish potential related in the South China Sea (WPP-NRI 711) says that the average production of demersal fish in Bangka Belitung is 73.598 tons per year. According to the analysis result of identification, the classification of \textit{Lutjanus viitata} is as follow: Kingdom :Animalia, Filum :Chordata, Subfilum :Vertebrata, Klas :Pisces, Ordo :Percomorphi, Famili :Lutjanidae, Genus :Lutjanus, Spesies :\textit{Lutjanus viitata}.

The fundamental difference of \textit{Caesio cuning} and \textit{Lutjanus viitata} is refractory pattern of color on the body. \textit{Caesio cuning} has caudal Fins with the upper part of the stem top and tail parts of the posterior dorsal fin but yellow belly and the pectoral fins are colorless to yellow. The upper body, which is not yellow, grayish blue. \textit{Lutjanus viitata}’s colour on upper body has brownish red with all fins yellow lateral line accompanied Brown to blackish [22]. Caesio cuning difference and Lutjanus viitata can be seen in Figure 2.

Figure 2. The Difference of: (a) \textit{Caesio cuning} and (b) \textit{Lutjanus viitata}
4. Conclusion
Based on the results of the research can be drawn the conclusion that the total of the whole calculation characters of morphometric of Yellow Tail Fish as many as 23 characters and meristic as many as 9 characters. On the character of the morphometric fish being sampled has the range of a total length of 12 cm up to 18.3 cm. Meristic characters showed that Yellow fish tail has the various formula D. IX.15 - D. X 15 (Dorsal Rays), A. III 10 – A. III 11 (Anal Rays), P. 18 (Pectoral Rays), V. 19-V. 20 (Ventral Rays) and C. 18-C. 22 (Caudal Rays) resulting in the identification of the key determinations indicate that the Yellow tail fish landed in PPN of Sungailiat Bangka Regency is represented to Umela Fish / Timun Fish(national languages) of the family Lutjanidae with the species is Lutjanus vitia.

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