

Morphometric and Meristic Characters of Putak Fish (*Notopterus notopterus*) in the Rokan River Basin Rokan Hilir Regency Riau

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ABSTRACT Putak fish (*Notopterus notopterus*) is a type of fish native to Indonesia which is protected based on Government Regulation Number 7 of 1999. Habitat and environmental factors are one of the factors that influence the survival, morphological and biological characteristics of putak fish. The waters of Rokan Hilir Regency, Riau, are one of the habitats of the putak fish (*Notopterus notopterus*). This research aims to determine the morphological, biological and physicochemical characteristics of the aquatic environment of putak fish (*Notopterus notopterus*) in the Rokan River, Rokan Hilir Regency, Riau. The method used in this research is a two-station observation method, identifying research stations using a purposive sampling method. Station 1 is in a community settlement and Station 2 is in an oil palm plantation on the riverbank. Data analysis uses quantitative description with simple linear regression. The results showed that at each station there were 22 fish consisting of 11 male fish and 11 female fish. The results of the morphological characteristics of total length are more dominant in female fish with an average length at station 1 of 211.91 mm and an average of 255.91 mm at station 2 compared to male fish with an average length of 211.91 mm exceeding 178.55 mm at station 1. and an average of 222.00 mm at station 2. Regression analysis shows that the morphology of putak fish (*Notopterus notopterus*) is in a positive biometric criteria state or at station 2 with TL/SL characters, while the other characters are negative. biomass state. The results of data on the biological characteristics of putak fish (*Notopterus notopterus*) at station 2 are higher than at station 1. The physicochemical factors of the two stations are differences in temperature, where the temperature at station 2 is higher than at station 1.

Keywords: Meristic; morphometric; putak fish (*Notopterus notopterus*); Rokan River; Rokan Hilir Regency Riau

INTRODUCTION

Rokan Hilir Regency is a district in Riau province, Indonesia. The capital is in Bagansiapiapi, a historic city and once known as the largest fish producer in Indonesia (Salina, et al., 2021). The waters of the Rokan estuary are one of the waters with a relatively high diversity of fish species in Indonesia. Aquatic resources are one of the largest aquatic biological resources. The potential of aquatic resources in the sea can be utilized for human benefit through fishing and fish farming activities. The richness of aquatic resources in the sea depends on the conditions of the aquatic environment and the recruitment ability of each type of fish. The waters of the Rokan River are home to unique fish species. One of the aquatic products that has economic value is the putak fish (*Notopterus notopterus*) (Putra et al., 2016).

Putak fish (*Notopterus notopterus*) is a type of fish native to Indonesia which is protected based on Government Regulation Number 7 of 1999 concerning Biological Types Protected in Indonesia (Wibowo et al., 2017). Based on the results of observations of putak fish in the waters of the Rokan River, it turns out that putak fish is one type of fish consumed by the public. Because putak fish has a delicious and special meat taste, this fish is very popular with the people, especially the people of Rokan Hilir Regency. The existence of putak fish in the sea is increasingly rare due to excessive fishing of putak fish. This could mean a decline in putak populations in the wild (Yusanti et al., 2022).

To maintain the uniqueness of the putak, it is necessary to manage the putak by examining its morphological characteristics. Morphological characterization includes the study of morphological characteristics and analysis of putak fish. Morphology is characteristics related to the size of the fish's body or body parts, such as total length and standard length.

This size is one of the factors that can be used as a taxonomic characteristic when identifying fish species. The measurement results are expressed in millimeters or centimeters, the resulting size is called absolute size. What is meant by analytical terms are characteristics related to the number of body parts of the fish, for example the number of scales on the lateral line, the number of strong and weak rays on the dorsal fin (Arifin et al., 2017).

Apart from that, to maintain its sustainability, putak fish is also influenced by abiotic factors. Abiotic factors that influence the survival of putak fish are physical and chemical factors such as temperature, salinity and pH meter. These biological characteristics can be initial information to determine the invasive potential of the putak fish (*Notopterus notopterus*) in the Rokan River, Rokan Hilir Regency, Riau. For this reason, researchers want to conduct a study on "Morphological and Histological Characteristics of Putak Fish (*Notopterus notopterus*) in the Rokan River, Rokan Hilir Regent, Riau".

MATERIALS AND METHODS

Time and place of research

The fish morphology analysis and measurement study was carried out from February to March 2023. The samples were putak fish (*Notopterus notopterus*) originating from the Rokan River. Identification, morphological measurements and analysis were carried out in the biology laboratory at Samudra University.

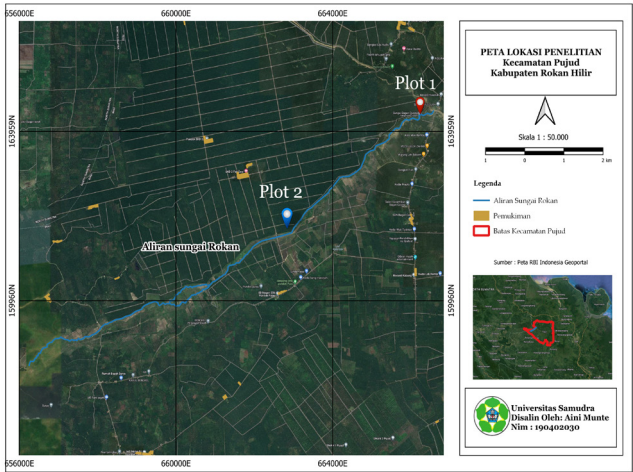


Figure 1. Sampling location for putak fish research (*Notopterus notopterus*).

Research tools and materials

Tools and materials used in research are scales, vernier calipers, stationery, camera, cool box, GPS, pH meter, thermometer, refraktometer, DO meter, observation sheet book, fishing net, glovev and putak fish.

Research methods

According to Sugiyono (2018) what is meant by research method is a scientific way to obtain data with a specific purpose and use. The method used in this research is the observation method. The observation method is a method of collecting data by direct observation of the variables to be studied and according to the facts found in the field.

Data collection
Observation

Data collection for this research was obtained from primary and secondary data. Primary data is data collected directly from the community through interviews or observations. Primary data through interviews was collected from fishermen who were then analyzed further, and primary data through observations was collected through measuring rig morphology and arithmetic on putak fish (*Notopterus notopterus*). Meanwhile, secondary data is data related to physical and chemical environmental factors in the habitat of the putak fish (*Notopterus notopterus*). Secondary data for this research can also be in the form of previous research, books, proceedings or journals related to the morphological characteristics and analysis of putak fish (Rianti et al., 2021)

Observation is a data collection technique that is carried out by observing the subject and then recording the results obtained (Hadinata et al., 2021) such as: putak fish found in the Rokan river, Rokan Hilir Regency, Riau.

Putak fish sampling

Sampling of putak fish was carried out for 2 months with sampling carried out twice a week. Sampling of putak fish was carried out by determining sampling points using the purposive sampling method, namely based on the catch area for putak fish with 2 stations. Where at each station a net/trap is placed with an area of 1 x 0.5 meters, totaling 3 nets/traps. The placement of nets/traps is carried out using a random sampling method at each station. The

net/trap is placed at 17.00 WIB and lifted at 07.00 WIB. When placing the nets/traps, physical and chemical factors are measured in the waters of the putak fish. Then, after completing the fish sampling, measurements were immediately carried out regarding morphometric and meristic characters. Look at the comparison between the fish found at station 1 and station 2. The number of putak fish samples taken was as many as the number of fish caught each time (Suriani et al., 2020).

Fish collection

Of the fish samples obtained from the research location, only samples that were in good condition (complete organs or no defects) and were still fresh were taken in varying sizes from smallest to largest. Samples are collected and then the measurement or morphometric and calculation or meristic processes are carried out.

Measuring and calculation

Fish samples that have been collected are then measured and calculated for morphometric and meristic characters. The morphometric characters measured in this study refer to research by Ariyanto (2003), which includes: total length (PT), standard length (PS), body length (PB), head length (PK) and caudal fin length (PSE). Measurements were carried out using a caliper with an accuracy of 0.01 mm. The fish samples were placed with their heads on the left.

The meristic characters calculated in this study refer to the research of, which includes the number of weak and hard rays on the dorsal fin, the number of weak and hard rays on the anal fin, the number of weak rays on the caudal fin, the number of weak and hard rays on the dorsal fin. -hard rays on the ventral fin, and a number of weak rays on the pectoral fin.

Documentation

According to Sugiyono (2017) documentation is a record of events that have passed. Documents can be in the form of writing, images, and other person's mental works. So researchers write and collect a number of documentation.

Data analysis technique
Comparative index of morphometric characters

The morphometric character comparison index obtained from the results of comparing morphometric characters consists of 3 comparison indices. The analysis in this research refers to the research of Muhotimah et al. (2013).

Table 1. Comparative index of morphometric characters.

Comparison index	Information
PT : PS	Total Length: Standard Length
PT : PK	Total Length: Head Length
PT : PB	Total Length: Body Length

Table 2. Morphometric characters of putak fish [Haryono \(2001\)](#).

No	Morphometric Characters	Code	Information
1	Total Length	TL	The distance between the tip of the leading head and the tip of the rearmost caudal fin
2	Standard Length	SL	The distance between the tip of the most anterior part of the head and the fold of the base of the caudal fin
3	Body Depth	BD	The highest distance between the dorsal and ventral
4	Eye Diameter	ED	Length of the midline of the eye socket
5	Interorbital Distance	ID	The straight distance between the eyes
6	Wide Mouth	WM	The distance between the two corners of the mouth if the mouth is opened as wide as possible
7	Distance Mouth to Nostrils	DMN	The distance between the leading edge of the head and the nostrils
8	Head Length	HL	The distance between the leading edge of the head and the posterior tip of the gill cover (operculum)
9	Head Height	HH	The length of the vertical line between the base of the upper head and the base of the lower head
10	Predorsal Length	PDL	The distance between the leading edge of the head and the leading edge of the dorsal fin
11	Dorsal Fin Height	DFH	The distance from the beginning of the dorsal fin to the end of the dorsal fin
12	Dorsal Fin Width	DFW	The distance between the leading edge of the weak dorsal fin to the tip of the weak dorsal fin
13	Prepectoral Length	PPL	The distance between the leading edge of the head and the leading edge of the pectoral fin
14	Pectoral Fin Height	PFH	The distance between the beginning of the pectoral fin to the end of the pectoral fin
15	Pectoral Fin Width	PFW	The distance between the leading edge of the pectoral weak fin to the leading edge of the pectoral weak fin
16	Preventral Length	PVL	The distance between the leading edge of the head and the leading edge of the ventral fin
17	Ventral Fin Height	VFH	The distance between the beginning of the ventral fin to the end of the ventral fin
18	Ventral Fin Width	VFW	The distance between the leading edge of the ventral weak fin to the leading edge of the ventral weak fin
19	Preanal Length	PAL	The distance between the leading edge of the head and the leading edge of the anal fin
20	Anal Fin Height	AFH	The distance from the beginning of the anal fin to the end of the anal fin
21	Anal Fin Width	AFW	The distance between the leading edge of the weak anal fin to the leading edge of the weak anal fin
22	Maxillary Length	ML	The distance from the leading edge of the upper mouth to the posterior tip of the maxillary bone
23	Low Jaw Length	LJL	The distance from the leading edge of the lower mouth to the posterior tip of the lower jaw bone

After the morphometric measurements of the putak fish (*Notopterus notopterus*) were carried out, the morphometric data was subjected to a linear regression analysis test to see how the growth status between total length (TL) and other morphometric characters was. Next, we also looked at the value of the morphometric correlation relationship (R^2).

Table 3. Morphometric growth status criteria for putak fish (*N. notopterus*).

Mark	Criteria
$b > 1$	Positive allometrics (AP)
$b < 1$	Allometric negative (AN)
$b = 1$	Isometrik

Source: [Suryana et al., 2015](#); [Heriyanto et al., 2020](#).

Based on the table above, if the b value is > 1 , the growth status is positive allometric (AP), which means that the increase in total length (TL) is slower than the length of the comparative morphometric character. If $b < 1$ then the growth status is allometric negative (AN), that is, the increase in total length is faster than the comparative morphometric character. And if $b = 1$ then the growth status is isometric, which means the growth in total length is proportional to the growth of other morphometric characters.

Table 4. Morphometric correlation relationship value criteria.

Mark	Criteria
$r = 0$	No connection
0 - 0.5	Weak correlation
0.5 - 0.8	Moderate correlation
0.8 - 1	Strong correlation

Source: Syafriadiman (2006).

Based on the following table, if the correlation value is equal to 0 then the correlation relationship is declared to have no relationship. If the correlation value is 0-0.5 then the correlation is weak, the correlation value is 0.5-0.8 then the correlation is moderate, then if the correlation value is 0.8-1 then the correlation is strong.

Meristic character analysis

The meristics calculated are the number of scales, number of dorsal fins, number of anal fins, number of pelvic fins and number of pectoral fins. Calculations are carried out using tweezers and a magnifying glass as tools to help calculate the type of meristic (Rianti *et al.*, 2021).

To see the meristic character of the putak fish (*Notopterus notopterus*), the number of anterior dorsal fin scales, the number of tail peduncle scales, the number of scales along the linea lateralis, the number of dorsal rays (D), the number of anal fin rays (A), were counted. number of ventral fin rays (V), and number of pectoral fin rays (P).

Table 5. Information on calculating the meristic characters of putak fish (*N. notopterus*).

No	Type	Character meristic	Remarks
1	Number of Scales	Front of dorsal fin Tail bar Along the linea lateralis	Number of anterior dorsal fin scales Number of scales on the tail peduncle Number of scales along the linea lateralis
2	Dorsal Fin Rays (D)		Number of hard and weak dorsal fin rays
3	Anal fin fingers (A)		Number of hard and weak anal fin rays
4	Ventral fin rays (V)		Number of hard and weak rays of the ventral fin
5	Pectoral fin fingers (P)		Number of pectoral fin rays

RESULTS AND DISCUSSION

This research was conducted in February-March 2023 and carried out in the Rokan River, Rokan Hilir Regency, Riau. Based on the results of research on the morphometrics and meristics of the Putak Fish (*N. notopterus*) which was carried out at 2 sampling locations. At station 1 there were 22 putak fish (*N. notopterus*) consisting of 11 male fish and 11 female fish, at station 2 there were also 22 putak fish (*N. notopterus*) consisting of 11 male fish and 11 female fish. Each fish has different characteristics and sizes which can be influenced by factors such as age, gender and living environment. The environmental factors referred to here include temperature, pH and salinity. The results of the research in the form of morphometric characters, meristics and environmental factors

are as follows.

Morphometric characters of putak fish (*Notopterus notopterus*)

Based on the results of research that has carried out measurements of 23 morphometric parameters of putak fish (*N. notopterus*) obtained at each station in the Rokan River, Rokan Hilir Regency, Riau, various morphometric characters were obtained. The morphometric characters of putak fish (*N. notopterus*) that were measured included the range, average and standard deviation of each morphometric character of both male and female fish.

Table 6. Morphometrics of male and female putak fish (*Notopterus notopterus*) at station 1 in the Rokan river, Rokan Hilir Regency, Riau.

Character	Male (n=11)		Female (n=11)		
morphometrics	Range (mm)	Average (mm) ±St. Deviation	Range (mm)	Average(mm) Deviation	±St.
TL	168-196	178.55 ± 8.90	168-231	211.91 ± 17.89	
SL	154-178	161.27 ± 7.68	154-211	195.09 ± 16.51	
BD	35-44	40.36 ± 3.55	38-56	50.55 ± 4.76	
ED	7-8	7.27 ± 0.45	8-10	8.45 ± 0.66	
ID	11-13	12.00 ± 0.43	10-16	13.45 ± 1.78	
WM	8-13	9.27 ± 2.09	8-13	10.73 ± 1.60	
DMN	1-2	1.36 ± 0.48	1-3	2.09 ± 0.51	
HL	25-34	31.64 ± 2.35	25-43	37.45 ± 5.53	
HH	24-33	25.64 ± 2.57	26-37	31.73 ± 4.29	
PDL	83-95	88.00 ± 3.52	85-114	106.45 ± 8.28	
DFH	18-20	18.18 ± 0.57	18-25	21.82 ± 1.75	
DFW	10-11	10.73 ± 0.45	10-20	15.45 ± 2.61	
PPL	30-34	31.91 ± 1.44	30-39	37.18 ± 2.69	
PFH	20-26	22.73 ± 1.76	22-31	27.55 ± 2.46	
PFW	6-17	14.00 ± 3.93	6-20	16.18 ± 4.11	

PVL	43-49	45.09 ± 2.07	46-60	52.82 ± 3.51
VFH	3-7	3.82 ± 1.11	4-12	5.91 ± 2.15
VFW	2-5	2.73 ± 0.96	2-11	4.27 ± 2.30
PAL	48-57	50.36 ± 2.46	48-68	58.27 ± 4.92
AFH	11-13	12.09 ± 0.90	13-17	15.09 ± 1.24
AFW	124-149	133.73 ± 8.61	132-185	165.27 ± 14.49
ML	12-19	14.27 ± 1.81	6-20	15.09 ± 3.85
LJL	9-12	11.64 ± 2.57	9-19	14.27 ± 2,63

Note: Total length (TL); standard length (SL); body height (BD); eye diameter (ED); interorbital distance (ID); mouth width (WM); mouth to nostril distance (DMN); head length (HL); head height (HH); predorsal length (PDL); dorsal fin height (DFH); dorsal fin width (DFW); prepectoral length (PPL); pectoral fin height (PFH); pectoral fin width (PFW); preventral length (PVL); ventral fin height (VFH); ventral fin width (VFW); preanal length (PAL); anal fin height (AFH); anal fin width (AFW); upper jaw length (ML); lower jaw length (LJL).

Table 7. Morphometrics of male and female putak fish (*Notopterus notopterus*) at station 2 in the Rokan river, Rokan Hilir Regency, Riau.

Character morphometrics	Male (n=11)		Female (n=11)		±St.
	Range (mm)	Average (mm) ±St. Deviation	Range (mm)	Average (mm) ±St. Deviation	
TL	188-261	222.00 ± 27.36	231-270	255.91 ± 12.06	
SL	165-245	206.09 ± 29.93	211-250	240.55 ± 10.33	
BD	43-66	53.45 ± 8.25	56-70	64.27 ± 4.05	
ED	7-11	8.91 ± 1.38	8-13	10.36 ± 1.30	
ID	10-16	13.64 ± 1.87	15-17	16.00 ± 0.43	
WM	8-13	10.82 ± 1.64	12-13	12.09 ± 0.29	
DMN	1-3	2.18 ± 0.57	2-3	2.55 ± 0.50	
HL	33-47	39.18 ± 6.01	42-50	46.91 ± 2.11	
HH	25-39	32.27 ± 5.69	37-45	39.55 ± 1.97	
PDL	90-131	110.82 ± 15.69	114-150	130.55 ± 7.74	
DFH	18-26	22.27 ± 2.60	23-28	25.45 ± 1.37	
DFW	11-19	14.18 ± 2.29	14-16	14.91 ± 0.51	
PPL	33-48	39.82 ± 5.61	39-50	46.36 ± 2.67	
PFH	23-35	29.36 ± 4.37	31-38	34.73 ± 1.54	
PFW	10-20	17.82 ± 2.85	15-20	19.55 ± 1.44	
PVL	44-65	55.73 ± 7.76	52-70	64.45 ± 4.23	
VFH	4-12	5.27 ± 2.18	5-6	5.27 ± 0.45	
VFW	2-11	3.73 ± 2.45	3-4	3.27 ± 0.45	
PAL	52-73	62.55 ± 8.68	61-78	72.55 ± 3.96	
AFH	13-17	14.91 ± 1.31	15-25	16.64 ± 2.67	
AFW	145-205	174.36 ± 23.52	185-215	203.18 ± 6.91	
ML	15-22	17.73 ± 2.77	20-25	21.36 ± 1.49	
LJL	12-19	15.27 ± 2.77	17-18	17.09 ± 0.29	

Note: Total length (TL); standard length (SL); body height (BD); eye diameter (ED); interorbital distance (ID); mouth width (WM); mouth to nostril distance (DMN); head length (HL); head height (HH); predorsal length (PDL); dorsal fin height (DFH); le bar dorsal fin (DFW); prepectoral length (PPL); pectoral fin height (PFH); pectoral fin width (PFW); preventral length (PVL); ventral fin height (VFH); ventral fin width (VFW); preanal length (PAL); anal fin height (AFH); anal fin width (AFW); upper jaw length (ML); lower jaw length (LJL).

Based on the data in the table, various morphometric data for putak fish (*Notopterus notopterus*) are obtained. Based on the morphometrics at both stations, the total length (TL) of female fish is greater than that of male fish. At station 1 there was a total length (TL) of female fish of 211.91 mm and the total length (TL) of female fish at station 2 was 255.91 mm. After knowing the morphometrics of the putak fish (*Notopterus notopterus*), the data was then seen to see the growth status of the morphometric characters of the putak fish.

The growth status of the morphometric characters of putak fish can be seen as follows:

Growth status of morphometric characters

After morphometric measurements were carried out, the data obtained was used to see the linear regression equation and the growth status of 23 morphometric characters of male and female putak fish (*Notopterus notopterus*) in 2 research locations. Next, determine the growth status of putak fish (*Notopterus notopterus*) using the regression equation.

Table 8. Growth status of morphometric characters of male and female putak fish (*Notopterus notopterus*) at station 1 in the Rokan river, Rokan Hilir Regency, Riau.

Character	Linear regression equations			
	Male (n=11)		Female (n=11)	
	Regression equations	Status allometric	Regression equations	Status allometric
TL/SL	$SL = 17.661 + 0.804 TL$	AN	$SL = 10.511 + 0.871 TL$	AN
TL/BD	$BD = -21.525 + 0.347 TL$	AN	$BD = -4.529 + 0.260 TL$	AN
TL/ED	$ED = 5.148 + 0.012 TL$	AN	$ED = 8.427 + 0.000 TL$	AN
TL/ID	$ID = 6.259 + 0.032 TL$	AN	$ID = -1.748 + 0.072 TL$	AN
TL/WM	$WM = -8.026 + 0.097 TL$	AN	$WM = -4.853 + 0.074 TL$	AN
TL/DMN	$DMN = -5.161 + 0.037 TL$	AN	$DMN = -2.853 + 0.023 TL$	AN
TL/HL	$HL = -2.440 + 0.191 TL$	AN	$HL = -20.685 + 0.274 TL$	AN
TL/HH	$HH = -3.108 + 0.161 TL$	AN	$HH = -3.786 + 0.168 TL$	AN
TL/PDL	$PDL = 21.973 + 0.370 TL$	AN	$PDL = 10.436 + 0.453 TL$	AN
TL/DFH	$DFH = 11.024 + 0.040 TL$	AN	$DFH = 4.727 + 0.081 TL$	AN
TL/DFW	$DFW = 5.060 + 0.032 TL$	AN	$DFW = -3.000 + 0.087 TL$	AN
TL/PPL	$PPL = 5.345 + 0.149 TL$	AN	$PPL = 7.362 + 0.141 TL$	AN
TL/PFH	$PFH = -7.136 + 0.167 TL$	AN	$PFH = 3.425 + 0.114 TL$	AN
TL/PFW	$PFW = 11.539 + 0.014 TL$	AN	$PFW = -13.698 + 0.141 TL$	AN
TL/PVL	$PVL = 17.316 + 0.156 TL$	AN	$PVL = 28.621 + 0.114 TL$	AN
TL/VFH	$VFH = 4.415 - 0.003 TL$	AN	$VFH = 6.818 - 0.004 TL$	AN
TL/VFW	$VFW = -6.221 + 0.050 TL$	AN	$VFW = 2.570 + 0.008 TL$	AN
TL/PAL	$PAL = 6.520 + 0.246 TL$	AN	$PAL = 15.139 + 0.204 TL$	AN
TL/AFH	$AFH = -0.511 + 0.071 TL$	AN	$AFH = 8.220 + 0.032 TL$	AN
TL/AFW	$AFW = -24.499 + 0.886 TL$	AN	$AFW = 7.961 + 0.742 TL$	AN
TL/ML	$ML = -19.020 + 0.186 TL$	AN	$ML = -6.835 + 0.103 TL$	AN
TL/LJL	$LJL = -33.103 + 0.251 TL$	AN	$LJL = -8.025 + 0.105 TL$	AN

Note: Negative allometrics (AN), total length (TL); standard length (SL); body height (BD); eye diameter (ED); interorbital distance (ID); mouth width (WM); mouth to nostril distance (DMN); head length (HL); head height (HH); predorsal length (PDL); dorsal fin height (DFH); le bar dorsal fin (DFW); prepectoral length (PPL); pectoral fin height (PFH); pectoral fin width (PFW); Preventral Length (PVL); Ventral Fin Height (VFH); ventral fin width (VFW); preanal length (PAL); anal fin height (AFH); anal fin width (AFW); upper jaw length (ML); lower jaw length (LJL)

Based on research data on the morphometric characters of male and female putak fish (*Notopterus notopterus*) at station 1, it was found that all the morphometric characters that had been measured had negative allometric status (AN), which means that the increase in total length (TL) was faster than the increase in the comparable morphometric characters. In male fish, it turns out that the

predorsal length (PDL) character has the greatest influence on total length (TL) growth, namely PDL has an influence of 21.973% on TL growth. Meanwhile, in female fish, there is a preventive length (PVL) character that has the greatest influence on total length (TL) growth, namely PVL has an influence of 28.621% on TL growth.

Table 9. Growth status of morphometric characters of male and female putak fish (*Notopterus notopterus*) at station 2 in the Rokan river, Rokan Hilir Regency, Riau.

Character	Linear regression equations			
	Male (n=11)		Female (n=11)	
	Regression equations	Status allometric	Regression equations	Status allometric
TL/SL	$SL = -31.004 + 1.068 TL$	AP	$SL = 40.963 + 0.780 TL$	AN
TL/BD	$BD = -13.043 + 0.300 TL$	AN	$BD = -17.136 + 0.318 TL$	AN
TL/ED	$ED = -0.741 + 0.043 TL$	AN	$ED = -14.951 + 0.099 TL$	AN
TL/ID	$ID = 1.426 + 0.055 TL$	AN	$ID = 14.561 + 0.006 TL$	AN
TL/WM	$WM = 2.300 + 0.038 TL$	AN	$WM = 9.838 + 0.009 TL$	AN
TL/DMN	$DMN = -1.861 + 0.018 TL$	AN	$DMN = 0.540 + 0.008 TL$	AN
TL/HL	$HL = -5.186 + 0.200 TL$	AN	$HL = 4.083 + 0.167 TL$	AN
TL/HH	$HH = -7.081 + 0.177 TL$	AN	$HH = 8.287 + 0.122 TL$	AN
TL/PDL	$PDL = -14.010 + 0.562 TL$	AN	$PDL = 12.008 + 0.463 TL$	AN
TL/DFH	$DFH = 2.461 + 0.089 TL$	AN	$DFH = -1.154 + 0.104 TL$	AN
TL/DFW	$DFW = 6.392 + 0.035 TL$	AN	$DFW = 9.489 + 0.021 TL$	AN
TL/PPL	$PPL = -5.142 + 0.203 TL$	AN	$PPL = -3.728 + 0.196 TL$	AN
TL/PFH	$PFH = -5.139 + 0.155 TL$	AN	$PFH = 6.957 + 0.109 TL$	AN
TL/PFW	$PFW = 1.376 + 0.074 TL$	AN	$PFW = 22.815 - 0.013 TL$	AN
TL/PVL	$PVL = -2.549 + 0.263 TL$	AN	$PVL = -8.351 + 0.284 TL$	AN

TL/VFH	$VFH = 4.626 + 0.003 TL$	AN	$VFH = 6.348 - 0.004 TL$	AN
TL/VFW	$VFW = 6.800 - 0.014 TL$	AN	$VFW = 4.348 - 0.004 TL$	AN
TL/PAL	$PAL = -1.122 + 0.287 TL$	AN	$PAL = 3.722 + 0.269 TL$	AN
TL/AFH	$AFH = 7.470 + 0.034 TL$	AN	$AFH = -8.722 + 0.099 TL$	AN
TL/AFW	$AFW = -13.134 + 0.845 TL$	AN	$AFW = 73.512 + 0.507 TL$	AN
TL/ML	$ML = -1.033 + 0.085 TL$	AN	$ML = -0.914 + 0.087 TL$	AN
TL/LJL	$LJL = 5.138 + 0.046 TL$	AN	$LJL = 14.838 + 0.009 TL$	AN

Note: Positive allometric (AP), negative allometric (AN), total length (TL); standard length (SL); body height (BD); eye diameter (ED); interorbital distance (ID); mouth width (WM); mouth to nostril distance (DMN); head length (HL); head height (HH); predorsal length (PDL); dorsal fin height (DFH); dorsal fin width (DFW); prepectoral length (PPL); pectoral fin height (PFH); pectoral fin width (PFW); preventral length (PVL); ventral fin height (VFH); ventral fin width (VFW); preanal length (PAL); anal fin height (AFH); anal fin width (AFW); upper jaw length (ML); lower jaw length (LJL).

Based on research data on the morphometric characteristics of male putak fish (*Notopterus notopterus*) at station 2, positive allometric status (AP) was obtained for the standard length (SL) character, which means that the increase in total length (TL) was slower than the standard length (SL) character. Meanwhile, other morphometric characters apparently have negative allometric status (AN), which means that the increase in total length (TL) is faster than the increase in comparative morphometric characters. Then, in station 2 female fish, it was found that all the morphometric characters that had been measured had

negative allometric status (AN), which means that the increase in total length (TL) was faster than the increase in the comparative morphometric characters. In male fish, it turns out that the character of anal fin height (AFH) has the greatest influence on total length (TL) growth, namely AFH influences 7.470% of TL growth. Meanwhile, in female fish, there is an anal fin width (AFW) character that has the greatest influence on total length (TL) growth, namely AFW has an influence of 73.512% on TL growth. Next, the growth status of morphometric characters was analyzed using correlation analysis (R²).

Table 10. Correlation value (R²) of male and female putak fish (*Notopterus notopterus*) at station 1 in the Rokan river, Rokan Hilir Regency, Riau.

Character	Morphometric correlation value (R ²).			
	Male (n=11)		Female (n=11)	
	(R ²)	Relationship status	(R ²)	Relationship status
TL/SL	0.869	Strong	0.891	Strong
TL/BD	0.755	Currently	0.956	Strong
TL/ED	0.057	Weak	0.000	There isn't any
TL/ID	0.450	Weak	0.522	Currently
TL/WM	0.170	Weak	0.675	Currently
TL/DMN	0.457	Weak	0.658	Currently
TL/HL	0.524	Currently	0.787	Currently
TL/HH	0.311	Weak	0.489	Weak
TL/PDL	0.876	Strong	0.957	Strong
TL/DFH	0.385	Weak	0.681	Currently
TL/DFW	0.402	Weak	0.357	Weak
TL/PPL	0.841	Strong	0.875	Strong
TL/PFH	0.713	Currently	0.683	Currently
TL/PFW	0.001	There isn't any	0.377	Weak
TL/PVL	0.449	Weak	0.338	Weak
TL/VFH	0.001	There isn't any	0.001	There isn't any
TL/VFW	0.215	Weak	0.004	There isn't any
TL/PAL	0.789	Currently	0.548	Currently
TL/AFH	0.487	Weak	0.219	Weak
TL/AFW	0.838	Strong	0.839	Strong
TL/ML	0.837	Strong	0.231	Weak
TL/LJL	0.754	Currently	0.511	Currently

Note : Total length (TL); standard length (SL); body height (BD); eye diameter (ED); interorbital distance (ID); mouth width (WM); mouth to nostril distance (DMN); head length (HL); head height (HH); predorsal length (PDL); dorsal fin height (DFH); le bar dorsal fin (DFW); prepectoral length (PPL); pectoral fin height (PFH); pectoral fin width (PFW); preventral length (PVL); ventral fin height (VFH); ventral fin width (VFW); preanal length (PAL); anal fin height (AFH); anal fin width (AFW); upper jaw length (ML); lower jaw length (LJL).

Based on the research data, there are morphometric characters that do not have a correlation relationship status, some have a weak, medium and strong relationship status. In station 1 male fish, the characteristics of pectoral fin width (PFW) and ventral fin height (VFH) do not have a correlation status with a correlation value of 0.001. The character that has the highest relationship status is

predorsal length (PDL) which has a correlation value of 0.876. Meanwhile, in female fish, there is an eye diameter (ED) character that has no correlation status and has the lowest correlation value of 0.000. The character that has the highest relationship status is predorsal length (PDL) which has a correlation value of 0.957.

Table 11. Correlation value (R2) of male and female putak fish (*Notopterus notopterus*) at station 2 in the Rokan river, Rokan Hilir Regency, Riau.

Character	Morphometric correlation value (R2).			
	Male (n=11)	Relationship status	Female(n=11)	Relationship status
TL/SL	0.953	Strong	0.829	Strong
TL/BD	0.987	Strong	0.899	Strong
TL/ED	0.744	Currently	0.845	Strong
TL/ID	0.646	Currently	0.025	Weak
TL/WM	0.409	Weak	0.136	Weak
TL/DMN	0.751	Currently	0.036	Weak
TL/HL	0.827	Strong	0.917	Strong
TL/HH	0.727	Currently	0.559	Currently
TL/PDL	0.962	Strong	0.521	Currently
TL/DFH	0.884	Strong	0.835	Strong
TL/DFW	0.176	Weak	0.247	Weak
TL/PPL	0.977	Strong	0.781	Currently
TL/PFH	0.945	Strong	0.720	Currently
TL/PFW	0.504	Currently	0.011	Weak
TL/PVL	0.857	Strong	0.659	Currently
TL/VFH	0.001	There isn't any	0.013	Weak
TL/VFW	0.024	Weak	0.013	Weak
TL/PAL	0.817	Strong	0.670	Currently
TL/AFH	0.489	Weak	0.200	Weak
TL/AFW	0.966	Strong	0.782	Currently
TL/ML	0.699	Currently	0.494	Weak
TL/LJL	0.204	Weak	0.136	Weak

Note : Total length (TL); standard length (SL); body height (BD); eye diameter (ED); interorbital distance (ID); mouth width (WM); mouth to nostril distance (DMN); head length (HL); head height (HH); predorsal length (PDL); dorsal fin height (DFH); le bar dorsal fin (DFW); prepectoral length (PPL); pectoral fin height (PFH); pectoral fin width (PFW); preventral length (PVL); ventral fin height (VFH); ventral fin width (VFW); preanal length (PAL); anal fin height (AFH); anal fin width (AFW); upper jaw length (ML); lower jaw length (LJL).

Based on the research data, there are morphometric characters that do not have a correlation relationship status, some have a weak, medium and strong relationship status. In station 1 male fish, the characteristics of pectoral fin width (PFW) and ventral fin height (VFH) do not have a correlation status with a correlation value of 0.001. The character that has the highest relationship status is predorsal length (PDL) which has a correlation value of 0.876. Meanwhile, in female fish, there is an eye diameter (ED) character that has no correlation status and has the lowest correlation value of 0.000. The character that has the highest relationship status is predorsal length

(PDL) which has a correlation value of 0.957.

Based on station 2 correlation data in male fish, there is a ventral fin height (VFH) character that has no relationship status, while the character that has the strongest correlation relationship status is the body height (BD) character which has a correlation value of 0.987. Meanwhile, in female fish, the character that has the lowest relationship status is the pectoral fin width (PFW) character which has a correlation value of 0.011. The character that has the strongest correlation status is the head length (HL) character which has a correlation value of 0.917.

Table 12. Results of observations and calculations of meristics of putak fish (*Notopterus notopterus*) in the Rokan River Flow, Rokan Hilir Regency, Riau.

No	Type	Meristic character	Amount station 1	Amount stasiun 2
1	Number of scales	Front of dorsal fin	93-100	96-115
		Tail trunk	8-11	7-15
		Along the lateral line	140-158	147-178
2	Dorsal fin rays (D)		6-8	6-10
3	Anal fin rays (A)		80-110	83-150
4	Ventral fin rays (V)		1	1
5	Pectoral fin radius (P)		9-14	9-16

After completion, look at the relationship status of the morphometric characters which includes allometric status and correlation relationships. Then look at the meristic character of the putak fish (*Notopterus notopterus*) in the Rokan river flow, Rokan Hilir Regency, Riau.

Meristic characters of putak fish (Notopterus notopterus)

Based on the research that has been carried out, the results of the meristic calculation of male and female Putak Fish (*Notopterus notopterus*) were obtained at stations 1 and 2 in the Rokan River, Rokan Hilir Regency, Riau.

From the table the number of scales on the putak fish at station 2 is greater than that of the putak fish at station 1. Likewise, the number of dorsal fin rays, anal fins, ventral fins and pectoral fins is also greater at station 2 compared to the number at station 1. After obtaining the meristic characteristics of the putak fish (*Notopterus notopterus*), we then look at the physical environmental factors of the putak fish (*Notopterus notopterus*).

Physical chemical environmental factors

Based on field observations, data was obtained on physical environmental factors that can influence the life and growth of male and female Putak Fish (*Notopterus notopterus*) at stations 1 and 2 in the Rokan River, Rokan Hilir Regency, Riau.

Table 13. Parameters of physical and chemical factors for observation stations of morphometric characters of putak fish (*Notopterus notopterus*) in the Rokan River Stream.

Parameter	Stasiun 1	Stasiun 2
pH	5 – 6	5 – 6
Salinitas	0 ppm–0.3 ppm	0 ppm – 0.3 ppm
Temperatur	29° - 30°	29° - 31°

From the results of the data that has been obtained the physical and chemical environmental parameters of male and female putak fish (*Notopterus notopterus*) are not too different between station 1 and station 2. At both stations pH data has been obtained, namely 5-6, salinity at both stations is 0 ppm – 0.3 ppm, while the temperature at station 1 was 29-30 °C and the temperature at station 2 was 29-31 °C.

Referring to Kordi & Tancung (2007), the optimal pH for fish growth is in the range of 6.5-9.0 (Latuconsina et al., 2012). A pH value > 9.0 can inhibit fish growth. The influence of pH values greatly influences aquatic biological communities (Novonti & Olem, 1994).

Morphometric characters of putak fish (*Notopterus notopterus*)

This research shows that the male and female putak fish (*Notopterus notopterus*) at station 1 are morphologically not significantly different from the catchment area at station 2 because they have very similar shapes and the morphological differences between them are very small. The research results show that the average size of putak fish (*Notopterus notopterus*) caught at station 2 is larger than the catch at station 1.

Based on measurements of the morphological characteristics of putak fish (*Notopterus notopterus*) carried out at 2 monitoring stations, 23 morphological characteristics with different values were obtained. It turned out that at stations 1 and 2 the morphological characteristics of total length were more dominated by females with an average size of 211.91 mm at station 1 and an average of 255.91 mm at station 2 compared to males. The fish only had an average size of 178.55 mm at station 1 and an average of 222.00 mm at station 2. The range of morphological values for female nipples (*Notopterus notopterus*) was greater than that of male fish. Differences in the range of character morphology values are caused by differences in age and gender (Affandi et al., 1992; Mulyani & Budijono, 2020). Female fish have longer and heavier bodies than male fish. In various types of fish, there

are also similarities in that female kalabau fish are larger than male kalabau fish (Nasution et al., 2006). This difference occurs because female fish have large ovaries in accordance with the fish's body length and weight (Jihad et al., 2014). Differences in the number and size of fish populations in waters can be caused by growth patterns, migration and the introduction of new types of fish into existing populations. One factor that influences fish growth patterns is food which can also stimulate the migration of several fish species (dahlan et al., 2015).

morphometric character growth status

Based on research data on the morphological characteristics of male putak fish (*Notopterus notopterus*) at station 2, positive allometric status (AP) was obtained for standard length (SL), meaning that the increase in total length (TL) was slower. rather than standard length (SL) characters. Meanwhile, the other morphological characters clearly have negative allometric status (AN), meaning that the increase in total length (TL) is faster than the comparative morphological characters. Then in female fish at station 2 it was found that all the morphological characters measured had negative allometrics (AN), meaning that the increase in total length (TL) was faster than the increase in total length (TL). (TL). their morphological characters are comparable (Heriyanto et al., 2020). In male fish, anal fin height (AFH) is thought to have the greatest influence on overall length (TL) growth rate, namely AFH influences 7.470% of TL growth rate. Meanwhile, in female fish, there is anal fin width (AFW) which has the greatest influence on overall length (TL) growth, namely AFW has an influence of 73.512% on TL growth.

The morphometric characters of station 1 male and female putak fish (*Notopterus notopterus*) did not have positive allometric status. There are 23 morphometric characters that have negative allometric status, namely TL with SL, BD, ED, ID, WM, DMN, HL, HH, PDL, DFH, DFW, PPL, PFH, PFW, PVL, VFH, VFW, PAL, AFH, AFW, ML, and LJJ. This means that at station 1 the increase in total length (TL) is faster than the increase in the comparable morphometric characters. Meanwhile, the morphometric character of the putak fish (*Notopterus notopterus*) of male fish at station 2 which has positive allometric status has only 1 character, namely TL with SL, which means that the growth of the standard length (SL) character is faster than the growth of the total length (TL) character. negative allometric status has 21 characters, namely TL with BD, ED, ID, WM, DMN, HL, HH, PDL, DFH, DFW, PPL, PFH, PFW, PVL, VFH, VFW, PAL, AFW, ML, and LJJ. Meanwhile, female fish do not have characters with positive allometric status. Female fish have 23 characters that have negative allometric status, namely TL with SL, BD, ED, ID, WM, DMN, HL, HH, PDL, DFH, DFW, PPL, PFH, PFW, PVL, VFH, VFW, PAL, AFH, AFW, ML, and LJJ. Positive allometric status is a relationship status that indicates that the increase in Total Length (TL) is slower than the growth of the comparison morphometric character. Meanwhile, the allometric status is negative, which means that the increase in total length (TL) is faster than the comparative morphometric character.

The growth condition can be determined based on the b value provided that if $b > 1$ then it is said to be a positive biometric, indicating that the increase in total length (TL) is slower than the length of the comparative morphological characteristics. If $b < 1$, then we talk about negative

biomass, which indicates that the increase in total length (TL) is faster than the increase in comparable morphological characteristics. Meanwhile, $b = 1$ or close to 1 is called isometric, which shows that the increase in total length (TL) is proportional to the increase in the length of the comparative morphological characteristics. (Suryana *et al.*, 2015; Heriyanto *et al.*, 2020).

The relationship between the linear regression equation for total length and the comparative characters is grouped into three parts, namely the relationship between total length and the characteristics of the head, body and fins. In this study, male and female putak fish (*Notopterus notopterus*) at stations 1 and 2 had negative allometric status in each part of the head, body and fins, which means the growth of each character was faster than the growth in total length.

Morphometric character relationship status

The linear regression equation of male and female offspring (*N. notopterus*) at stations 1 and 2 produces a correlation value that shows how close the relationship is between characters with low, medium and strong relationship status. Thanks to the linear regression equation according to Galton in Kustianto (1994), especially $y = a + bx$. From the linear regression equation, the r value (correlation coefficient) is obtained which represents the correlation relationship between total length (TL) and other morphological characters.

Based on research data, some morphological characteristics do not have correlation status, some also have weak, medium and strong relationship status. In stage 1 male fish, the characteristics of pectoral fin width (PFW) and pelvic fin height (VFH) have no correlation with a correlation value of 0.001. The trait that has the highest relationship status is anterior dorsal length (PDL) with a correlation value of 0.876. Meanwhile, in female fish, eye diameter (ED) has no correlation and has the lowest correlation value of 0.000. The trait that has the highest relationship status is anterior dorsal length (PDL) with a correlation value of 0.957 (Syafriadiman, 2006).

At station 1, male putak fish have a strong correlation status, namely the relationship between TL and SL, PDL, PPL, AFW, and ML. Female fish at station 1 that have a strong correlation are TL with SL, BD, PDL, PPL, and AFW. Meanwhile, at station 2, male putak fish that have a strong correlation status are TL with SL, BD, HL, PDL, DFH, PPL, PFH, PVL, PAL and AFW. Female fish at station 2 that have a strong correlation status are TL with SL, BD, ED, HL, and DFH. Strong correlation means that as the Total Length (TL) increases, the morphometrics of the comparative character also increases.

The correlation status of the male putak fish at station 1 is the relationship between TL and BD, HL, PFH, PAL, and LJL. In station 1 female fish that have a moderate correlation, namely TL with ID, WM, DMN, HL, DFH, PFH, PAL, and LJL. Meanwhile, at station 2, male putak fish had a moderate correlation, namely TL with ED, ID, DMN, HH, PFW, and ML. The female putak fish at station 2 which has a moderate correlation is TL with HH, PDL, PPL, PFH, PVL, PAL, and AFW. Medium correlation means that if the total length increases, some of the morphometric characteristics of the comparison increase, but there are also some comparison characters that do not increase.

The weak correlation status of the male putak fish at

station 1 is the relationship between TL and ED, ID, WM, DMN, HH, DFH, DFW, PVL, VFW, and AFH. In station 1 female fish that have a weak correlation, namely TL with HH, DFW, PFW, PVL, AFH, and ML. Meanwhile, at station 2, the male putak fish that had a weak correlation were TL with WM, DFW, VFW, AFH and LJL. Female putak fish at station 2 that have a weak correlation are TL with ID, WM, DMN, DFW, PFW, VFH, VFW, AFH, ML, and LJL. Weak correlation means that as the total length (TL) increases, the dominant comparative character does not increase.

The correlation status that does not exist has a relationship with male putak fish at station 1, namely the relationship between TL and PFW, VFH. In station 1 female fish, there is no relationship, namely TL with ED, VFH, and VFW. Meanwhile, at station 2, there was no correlation between male putak fish, namely TL and VFH. There are no female putak fish at station 2 that do not have a correlation between characters. No correlation means that there is no relationship at all between TL growth and other comparative morphometric characters.

According to Syafradiman (2006), it states that if the value of $r = 0$ there is no relationship, 0-0.5 is a weak correlation, 0.5-0.8 is a moderate correlation, 0.8-1 is a strong or close correlation. The correlation value, which shows the closeness of the relationship between characters with strong and moderate relationship status, is thought to be influenced by current speed and dissolved oxygen in the dry season. The speed of the current makes the fish move more actively so it requires a lot of energy to be used for activities and looking for food (Nurasiah *et al.*, 2018).

Meristic characters of putak fish (*Notopterus notopterus*)

Based on measurements carried out in research on the meristic characteristics of putak fish (*Notopterus notopterus*) at station 1, the number of scales was obtained, namely the front scales of the dorsal fin were 93-100, the tail peduncle scales were 8-11, the scales along the lateral line were 140-158, the dorsal fin rays (D) 6-8, anal fin rays (A) 80-110, ventral fin rays (V) 1, and pectoral fin rays (P) 9-14.

The measurements that have been carried out in research on the meristic characteristics of putak fish (*Notopterus notopterus*) at station 2 obtained the number of scales, namely scales in front of the dorsal fin 96-115, scales on the tail peduncle 7-15, scales along the linea lateralis 147-178, dorsal fin rays (D) 6-10, anal fin rays (A) 83-150, ventral fin rays (V) 1, and pectoral fin rays (P) 9-16.

The results of the research are in line with research conducted by Rianti *et al.* (2021), in the Sei Gesek Reservoir, Bintan Regency, the meristic character of the belida fish (*N. notopterus*) was found to only have weak fingers. It was found that each number of fin rays was, dorsal fin rays (D): 6-7, anal fin rays (A): 98-111, ventral fin rays (V): 1, and Pectoral fin rays (P) 11-14. The front scales of the dorsal fin number 100-103, the scales on the caudal peduncle number 12-14, and the scales along the linea lateralis number 150-168.

Physical chemical factors

Based on measurements that have been carried out regarding the physical and chemical factors at each station, they are not too different, at station 1 there is a pH of 5-6, salinity of 0-0.3 ppm, and a temperature of 29-30°.

Meanwhile, at the station the pH was 5-6, salinity 0-0.3 ppm, and temperature 29-31 °.

Referring to Kordi & Tancung (2007) the optimal pH for fish growth is around 6.5 - 9.0 (in Latuconsina et al, 2012: 40). A pH value > 9.0 can inhibit fish growth. The influence of the pH value has a great influence on aquatic biological communities (Novonti & Olem, 1994).

CONCLUSION AND RECOMMENDATION

Conclusion

From the morphometric characters of the putak fish (*Notopterus notopterus*) in the Rokan river, Rokan Hilir Regency, Riau, the female putak fish is larger than the male putak fish. Morphometric character growth can be positive allometric and negative allometric. If it is allometrically positive, the growth of the total length (TL) character will be slower than the comparative morphometric character. Meanwhile, if the allometric character is negative, the growth of the total length (TL) character will be faster than the comparative morphometric character. Among these characters, there are weak, medium and strong relationships. And there are also characters who have no relationship. When observing the meristic characteristics of putak fish (*Notopterus notopterus*) in the Rokan River, Rokan Hilir Regency, Riau, there were meristic characteristics at station 1, the number of scales was obtained, namely scales in front of the dorsal fin 93-100, scales on the tail peduncle 8-11, scales along the linea lateralis 140-158, dorsal fin rays (D) 6-8, anal fin rays (A) 80-110, ventral fin rays (V) 1, and pectoral fin rays (P) 9-14. As for the meristic characteristics of the putak fish (*Notopterus notopterus*) at station 2, the number of scales was obtained, namely the front scales of the dorsal fin were 96-115, the tail peduncle scales were 7-15, the scales along the linea lateralis were 147-178, the dorsal fin rays (D) were 6-10, anal fin rays (A) 83-150, ventral fin rays (V) 1, and pectoral fin rays (P) 9-16. Regarding the physical and chemical factors at each station, they are not too different, at station 1 there is a pH of 5-6, salinity of 0-0.3 ppm, and a temperature of 29-30 °. Meanwhile, at the station the pH was 5-6, salinity 0-0.3 ppm, and temperature 29-31 °.

Recommendation

With this research, it can be seen what the morphometric and meristic characteristics of the putak fish (*Notopterus notopterus*) are in the Rokan River, Rokan Hilir Regency, Riau. It is hoped that future researchers will need to carry out further research over a longer period and with a larger number of samples to obtain data that truly represents the actual situation. Apart from that, it would be better to do more research on the putak fish (*Notopterus notopterus*) in the Rokan river, Rokan Hilir Regency, Riau, one example is the type of food.

AUTHOR'S CONTRIBUTIONS

AM is the implementing researcher and compiler of the manuscript; SS is the finalized the manuscript and SJ is the revised the final manuscript.

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