



The Morphological Characteristic of the Male and Female the *Diplocheilichthys pleurotaenia* (Cyprinidae) in the Kampar River, Riau, Indonesia

Muhammad Fauzi^{a*}, Usman M Tang^b, Indra Junaidi Zakaria^c, Dahelmi^d

^a*University of Andalas, Padang & Faculty of Fisheries and Marine Science University of Riau, Jl. H.R. Soebrantas
Km 12,5 Simpang Baru, Pekanbaru, 28000, Indonesia*

^b*Faculty of Fisheries and Marine Science University of Riau, Jl. H.R. Soebrantas Km 12,5 Simpang Baru,
Pekanbaru, 28000, Indonesia*

^{c,d}*Faculty of Math and The Natural Science University of Andalas Padang, Limau Manis, Padang, 25163,
Indonesia*

^a*Email: mfauzi.pku@gmail.com*

^b*Email: usman_mt@yahoo.com*

^c*Email: indrajz@yahoo.com*

^d*Email: dahelmi@gmail.com*

Abstract

A study on morphological characteristic of the male and female of *Diplocheilichthys pleurotaenia* obtained from River Kampar has been conducted in November 2011 - August 2013. This study aims to understand the similarity and the differences of the male and female characteristic of the fish that inhabit in the River Kampar. There were 52 fishes of males and 85 fishes of females were examined in this study. Morphological characteristics were examined consisted of 43 characteristics. The research may explain that the morphological characteristics between male and female of the fish and the types were based on its morphology. The morphometric characters were difference between male and female of fish are Height under linealateralis (TBbl), Width caudal peduncle (LBE), Length from pelvic fin to anal fin (JSVSA), Height dorsal fin (TSD), Height pectoral fin (TSP) and length pelvic fin (TSV).

* Corresponding author.

Keywords: Diplocheilichthys pleurotaenia; morphological characteristic; fish.

1. Introduction

Kampar River is one of big rivers in Riau Province, in Indonesia. In 1996, a reservoir was built in the river flow for a water power plant. As consequence, it has changed the water mass due to the dam of the reservoir; it led to change the biotic and abiotic characteristics in both side of the streams of the reservoir as well. Physically, the reservoir has cut off the river flow then leads the water to flow to the turbine path. The flow of the water in the reservoir is not completely closed because the water gate is opened if the water volume is too high. However, it is not easy for fish to cross over the reservoir due to its construction. For that instance, the natural movement of schooling fish has been obstructed since the reservoir was built.

In the whole catchment area of river Kampar it was found a lot of fish species from at least of 9 (nine) order such as the Ostariophysi which contains of 81 species, the Labyrinthysi which contains of 20 species, the Percomorphi which contains of 5 species, the Malacopterygii that containe of 3species, the Synentognathi which contains of 2 species, then the Batoidei, the Synbrachoidea, the Plectognathi and the Opisthomi each of them contains of 1 species [1][2]. However, during the research conducted in 2004 it was found that the number of species in river the Kampar decreased[3]. The fish species that had been decreased in number and rare was Diplocheilichthys pleurotaenia (“ikan lelan”). This species is native species in Kampar River and it is included as one of five rare species in the upstream of the water power plant of Kotopanjang [4].

The Lelan (*Diplocheilichthys pleurotaenia*) is considered an indegerous species which is not easy to be found around the upstream of the resevoir. While around the downstream areas of the resevoir, sometime it could be found in a limited number. The communities in all of the areas consumed the fish Lelan in fresh. The price could be reached from Rp. 35.000.- to Rp. 90.000.-/kg.

Effort in order to maintain the sustainability on Lelan in their habitate is very important. However, the effort so far only be based on research activities. Some researchers had conducted an exploration its taxonomy [5][6][7][8][9], while had conducted some survey on their availability in some of these areas[10].

While the research were commonly still in the step of a taxonomies, and on the hand the fishes tend to rapidly decrease, so, it is important to study about the biology of *D. pleurotaenia*. In the first step it is very urgent to explore a knowledge on the characteristic morphology of the male and female.

2. Materials and Methods

2.1. Study Area

The sampling locations took place in the catchment area of Kampar River. This area was divided into two main parts. They were in the upstream and downstream of the reservoir of the water power plant. The sampling sites in the upstream consisted of three sites. They were in Desa Bandur Picak (0°23'30,52" N; 100°30'58,82" E), Desa Tanjung (00°19'28,1" N; 100°38'28,7" E), and Desa Muara Takus (0°19'51,8" N; 100°38'38,8" E). Three other sites downstream were in Desa Pulau Belimbing (0°18'1,45" N; 100°54'53,23" E), Desa Alam Panjang

(0°20'42,69" N; 101°8'42,70" E), and Desa Danau Bengkuang (0°21'26,16" N; 101°14'0,23" E) (Figure 1).

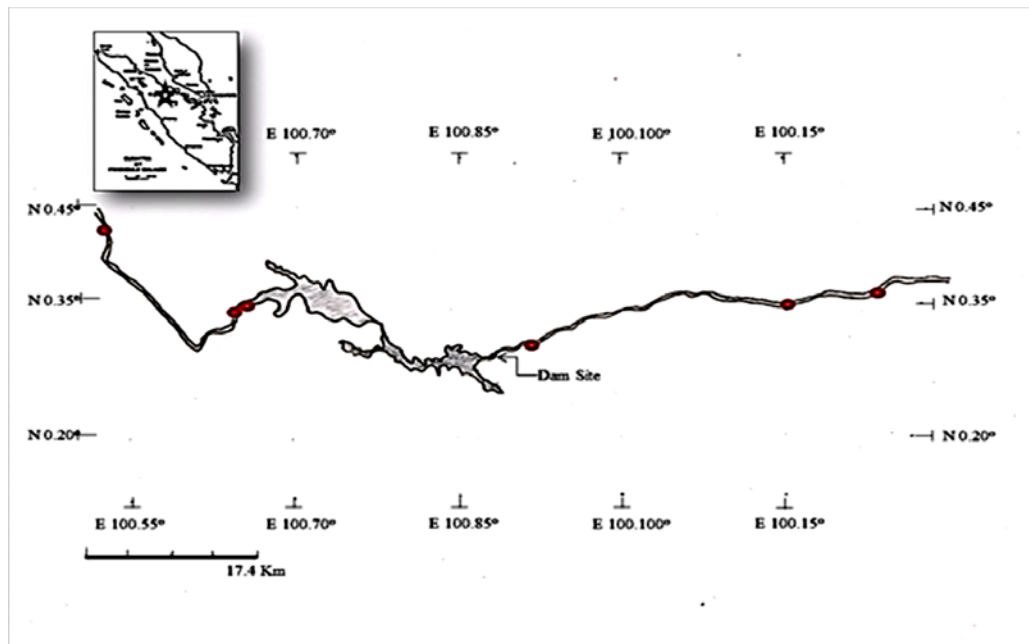


Figure 1: Sampling location in the upstream and downstream of the power plant of Kotopanjang in the Kampar River

2.2. Procedures

Samples of fish were caught by gill net and the fishing ground were mark with GPS. It had been done between November 2011 - Augusts 2013. Other tool and equipment were consisted of plastic jars, syringes, digital camera, and digital caliper with 0.01 mm precision, meter tape, pin set, stereomicroscope, mask, gloves, loop, measuring glass, wiped-tissue, rope, yarn, and writing tools. The substances such as formaldehyde with 10 %, 4 % concentration, and alcohol with 70 % concentration were also used.

The size of the fish that had been caught by the gill net and lift net, were ranges about one to two inches. Fishing was carried out as long as two hours (06:00 – 08:00 AM; and 04:00 – 06:00 PM). All catches then moved to fishery lab for classification and further analysis. The whole procedures of treatment onto catches were referred to guide the fish handling [11].

The fish specimen were sorted and identified on the level of species by using identification guides and descriptions of fish [12][10]. The morphometric characteristic was included all of the parts of the body by using laminating graphic papers, ruler, and Caliper with the accuracy of 0.1 mm. (Table 1). The measurement of the body parts can be seen in figure 2. All of the measurements were conducted in the laboratory.

The morphometric characteristic were analyzed by descriptive statistic, while the morphometric on the total length (TL) by using non parametric differentiate test according to Mann-Whitney, the difference between male and female was using the IBM SPSS Statistic software of the version 21.

Table 1: Measuring of the morphology characteristic

No.	Code	Description	No.	Code	Description
1	TL	Total Length	24	PDSA	Lenght Anal fin
2	PSD	Standard Length	25	TSA	Hight anal fin
3	PK	Head length	26	PDSV	Lenght Pelvic fin
4	TK	High height	27	TSV	Height pelvic fin
5	TB	Body depth	28	PSE	Lenght Caudal fin
6	TBE	High caudal peduncle	29	LSE	Height caudal fin
7	LB	body width	30	JMBTI	Lenght from the tip of the mouth to the bottom of the gill cover
8	TbaL	Body height above Linea lateralis	31	JBTIPSD	Lenght under the gill cover to the base of the dorsal fin
9	TBbL	Body height under linea lateralis	32	JKPSV	Lenght head to the base of the pelvic fin
10	JMSD	Predorsal length	33	JBTIPSV	Lenght under the gill cover to the base of the pelvic fin
11	JMM	Preorbital length	34	JKPSD	Lenght head to the base of the dorsal fin
12	JMSP	Prepectoral length	35	JPSDPDV	Lenght to the base of the dorsal fin to the base of the pelvic fin
13	SNE	Snout	36	JPSVASD	Lenght the base of the pelvic fin to the end of the dorsal fin
14	JMSV	Prepelvic lenght	37	JPSDASV	Lenght to the base of the dorsal fin to the end of the pelvic fin
15	PBE	Caudal peduncle	38	JASVARD	Lenght from the end of the pelvic fin to the end of the dorsal fin
16	LBE	Width caudal peduncle	39	JASVPSA	Lenght end of the pelvic fin to the base of the anal fin
17	DM	Eye diameter	40	JASDPSA	Lenght from the end of the dorsal fin to the base of the anal fin
18	JMTI	Lenght from eye to the gill cover	41	JASDASA	Lenght end of the dorsal fin to the end of the anal fin
19	JSVSA	Lenght from pelvic fin to anal fin	42	JASAPASC	Lenght to the base of the anal fin on the caudal fin
20	PDSD	Lenght Dorsal fin	43	JASDPASC	Lenght to the base of the dorsal fin on the caudal fin
21	TSD	Height dorsal fin			
22	TDSP	Lenght Pectoral fin			
23	TSP	Height pectoral fin			

3. Results and Discussion

Taxonomically the Lelan is considered into the class of Pisces, subclass of Teleost, the order of Cypriniformes, the family of Cyprinid, the genus of Osteochilus, and the species of Osteochilus pleurotaenia[10]. While the Lelan is considered into the order of Ostariophysi, the sub order of Cyprinodea, the family of Cyprinidae, the genus of Labeo, and the species of Labeo pleurotaenia [12]. The synonym of Labeo pleurotaenia, is genus Diplocheilichthys, the species of Diplocheilichthys pleurotaenia (Figure 3).

The result from the descriptive analysis of morphometric variable between the female and male *D. pleurotaenia* can be seen in the Table 2. The Total Length (TL) of the female were around 123-283 mm with the average of 187.35 mm, while the male were around 128-257 mm, with the average of 184.27 mm. The standard length(PSD) of the female were between 96-215 mm with the average of 140.37 mm and the male were around 80-201 mm with the average of 138.77 mm. The female head length (PK) were between 17.9-39.0 mm with the average of 26.40 mm, while the male head length were 19.0-39.0 mm with the average of 25.74 mm. Then the female high height (TK) were around 12.0-37.0 mm with the average of 22.40 mm, while the head high of male were around 14.0-32 mm with the average of 21.81mm.

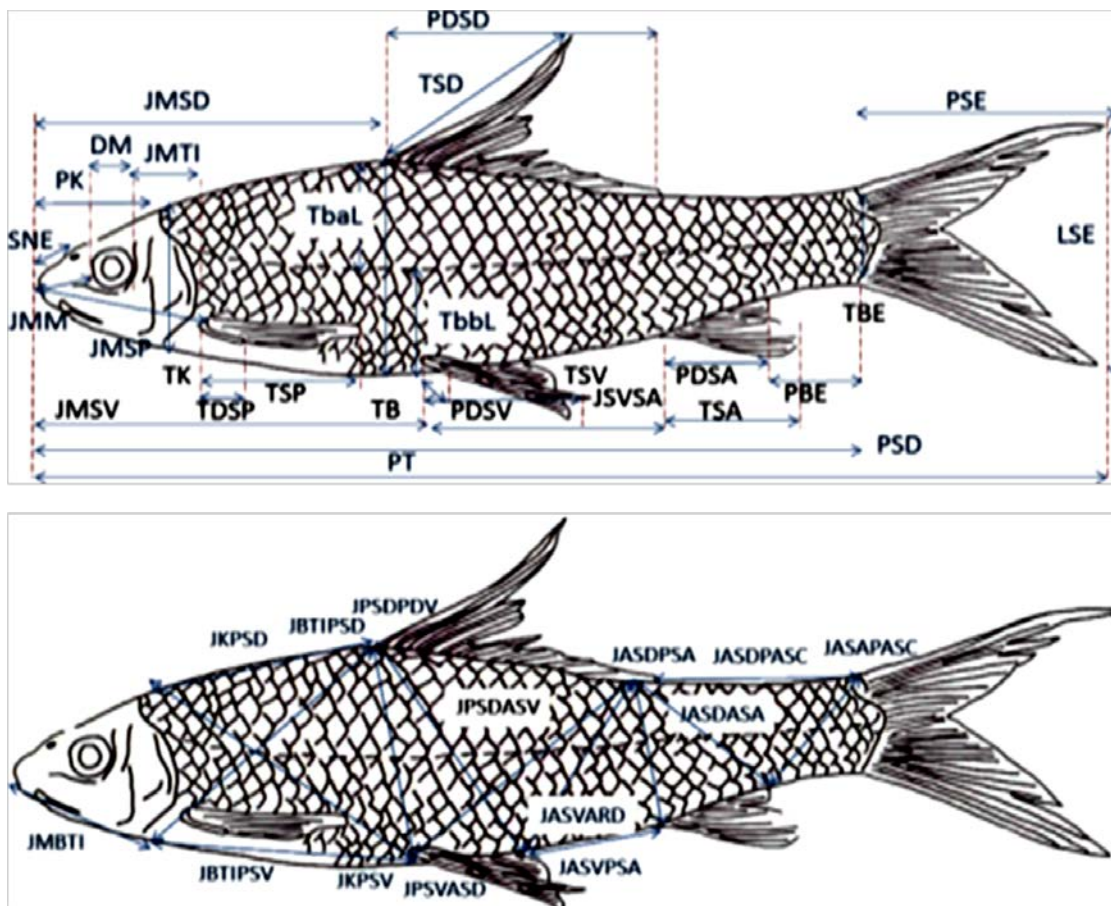


Figure2: Measurement the length and fish morphometric



Figure 3: Fish of lelan (*D. pleurotaenia*)

Measurement data of the body depth(TB) shows that the female were between 18.0-57.3 with the average of 36.57 mm, while the male were between 20.0-49.0 mm with the average of 35.20 mm. The high of caudal penducle (TBE) the female were between 9.0-24.4 mm with the average of 15.51 mm, while the male were between 8.0-20.6 mm with the average of 15.41 mm. The body width (LB)of the female were between 11.0-32.2 mm with the average of 19.83, while the male were between 11.0-28.1 mm with the average of 19.51 mm. The body high above the linealiteralis (TbaL) of the female were between 13.0-34.6 with the average of 22.68 mm, while the male were between 14.0-33.1 mm with the average of 22.52 mm. The body high under the lineliteralis (TBbL) were between 12.3-40.1 mm with the average of 19.83 mm, while the male were between 11.0-26.0 mm with the average of 17.92 mm. The other morphometric comparison can be seen in the Table 2.

Table 2: The Results of descriptive analysis of morphological characters

CODE	SEX	Mean (mm)	Min (mm)	Max (mm)	CODE	SEX	Mean (mm)	Min (mm)	Max (mm)
PT	Female	187,35	123	283	TSP	Female	26,67	16	40
	male	184,27	128	257		male	27,68	17	42
	Total	186,18	123	283		Total	27,05	16	42
PSD	Female	140,37	96	215	PDSA	Female	16,76	8	31
	male	138,77	80	201		male	16,84	10	35
	Total	139,76	80	215		Total	16,79	8	35
PK	Female	26,4	17,9	39	TSA	Female	26,77	15	42
	male	25,74	19	39		male	27,76	17	40

CODE	SEX	Mean (mm)	Min (mm)	Max (mm)	CODE	SEX	Mean (mm)	Min (mm)	Max (mm)
	Total	26,15	17,9	39		Total	27,15	15	42
TK	Female	22,4	12	37	PDSV	Female	15,47	5,4	45
	male	21,81	14	32		male	15,02	5	40
	Total	22,18	12	37		Total	15,3	5	45
TB	Female	36,57	18	57,3	TSV	Female	26,7	16	39,7
	male	35,2	20	49		male	27,65	17	40
	Total	36,05	18	57,3		Total	27,06	16	40
TBE	Female	15,51	9	24,4	PSE	Female	45,02	30	73,2
	male	15,41	8	20,6		male	44,15	21	63
	Total	15,47	8	24,4		Total	44,69	21	73,2
LB	Female	19,84	11	32,2	LSE	Female	40,27	15	72
	male	19,51	11	28,1		male	38,34	15	62
	Total	19,71	11	32,2		Total	39,54	15	72
TbaL	Female	22,68	13	34,6	JMBTI	Female	28	15	43
	male	22,52	14	33,1		male	28,18	20	41,4
	Total	22,62	13	34,6		Total	28,07	15	43
TBbL	Female	19,83	12,3	40,1	JBTIPSD	Female	49,72	27	75
	male	17,92	11	26		male	47,48	26	67
	Total	19,1	11	40,1		Total	48,87	26	75
JMSD	Female	63,23	43,6	93,7	JKPSV	Female	52,82	26	78,3
	male	63,11	43,6	87,6		male	52,63	27	75
	Total	63,18	43,6	93,7		Total	52,75	26	78,3
JMM	Female	12,99	7,9	20,9	JBTIPSV	Female	41,72	22	66,6
	male	12,56	8,8	16,7		male	40,28	25	60,7
	Total	12,82	7,9	20,9		Total	41,18	22	66,6
JMSP	Female	31,75	20,8	45,3	JKPSD	Female	39,63	25	62,1
	male	31,29	20,8	41,5		male	38,26	25	54,9
	Total	31,57	20,8	45,3		Total	39,11	25	62,1
SNE	Female	8,7	5,1	15	JPSPDPV	Female	39,65	25	59
	male	8,88	7	11		male	38,43	25	55
	Total	8,77	5,1	15		Total	39,19	25	59
JMSV	Female	68,94	45,5	124,5	JPSPVSD	Female	41,75	20	63
	male	67,79	45,5	91,8		male	40,75	25	57
	Total	68,5	45,5	124,5		Total	41,37	20	63
PBE	Female	22,69	10	40,1	JPSPDASV	Female	42,18	25,3	66
	male	23,08	11	40		male	41,5	22	60

CODE	SEX	Mean (mm)	Min (mm)	Max (mm)	CODE	SEX	Mean (mm)	Min (mm)	Max (mm)
	Total	22,84	10	40,1		Total	41,92	22	66
LBE	Female	7,84	3,3	13,6	JASVARD	Female	37,77	20	58
	male	8,8	3	18		male	37	20	55
	Total	8,2	3	18		Total	37,48	20	58
DM	Female	7,84	5	13,1	JASVPSA	Female	31,12	19	49,8
	male	7,72	5	10,8		male	30,9	20	46
	Total	7,79	5	13,1		Total	31,04	19	49,8
JMTI	Female	11,31	6,8	16,3	JASDPSA	Female	31,26	17	45,8
	male	11,6	9,4	15,7		male	30,83	20	45
	Total	11,42	6,8	16,3		Total	31,1	17	45,8
JSVSA	Female	37,46	17	57	JASDASA	Female	33,44	21,6	50,5
	male	37,47	17	54,4		male	33,9	21,7	60
	Total	37,47	17	57		Total	33,62	21,6	60
PDSB	Female	40,43	18	80	JASAPASC	Female	29,53	19,4	44,2
	male	38,85	25	62		male	29,42	19,2	43,4
	Total	39,83	18	80		Total	29,49	19,2	44,2
TSD	Female	34	20	50,3	JASDPASC	Female	44,9	25	72,8
	male	36,2	21	53		male	43,55	20	80
	Total	34,83	20	53		Total	44,38	20	80
TDSP	Female	12,58	5,2	30					
	male	11,91	5,7	35					
	Total	12,33	5,2	35					

Morphometric test between the character of Mann-Whitney and trauss on the male of female shows that the different character on the value of asymp.Sig < 0,05 was the body high under linealateralis(TBbl) with the value of z TBbl was -3,965 and the asymp.Sig 0,000, the value width caudal peduncle(LBE) z LBE was -2,005 and the asymp.Sig 0,045, the distance of length from pelvic fin to anal fin (JSVSA) was z JSVSA -2,604 and the asymp.Sig 0,009, The height dorsal fin (TSD) was z TSD -3,764 and the asymp.Sig 0,000, The height pectoral fin (TSP) was z TSP -2,557 and the asymp,sig 0,011, and the height of pelvic fin (TSV) was z TSV -2,491 and the asymp.Sig 0,013.

The Trauss morphological character of male and female lelan is on the body high under the Height under linealateralis (TBbl), the Width caudal peduncle (LBE), the Length from pelvic fin to anal fin (JSVSA), the Height dorsal fin (TSD), the Height pectoral fins (TSP) and length pelvic fin (TSV). Related to the morphological type of D. pleurotaenia, it was found for at least six differences on its character between the male and the female, however, study conducted on the trauss morphometric character's on brek (Puntius orphoides) it was found 13 differentiating between the male and the female brek, while on the tawes found 11 differentiating

characters between the male and the female [13]. Study on the group of cyprinid especially on Mahisefid (*Rutilus frisii* kutum) it was also different between the male and the female morphology [14].

4. Conclusion

This study provided basic information on the sex characteristic morphometric on various body dimension of *D. pleurotaenia* from the upstream dan downstream reservoir Kampar river, Riau Province, Indonesia which would be effective for fishery biologists dan conservationists to impose adequate regulation for sustainable fishery management and conservation of its numerous stock in the river. These results will help in further studies on the biological and reproduction aspect of the species in the Kampar River. In recognition of morphological characteristics decisive the difference between male and female fish then it must undertake domestication. The stages of domestication research activities are an initial step to do restocking as one that could preserve the fish in their natural habitat.

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