



Morphological characters of freshwater stingrays (Chondrichthyes: Dasyati- dae) in Musi River, Palembang City, South Sumatra Province

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Abstract

A study to determine morphological characters of freshwater stingray in Musi River of South Sumatra Province has been conducted from June to December 2020. The fishes were collected in Musi River where located at middle of Palembang city. Collected specimens were preserved to Animal Ecology Laboratory, Department of Biology, Faculty of Mathematic and Natural Science of Sriwijaya University. There are four species of freshwater stingrays collected, *Fluviatrygon oxyrincha*, *Fluviatrygon kittipongi*, *Fluviatrygon signifer*, and *Fluviatrygon* sp 'musi' 2. The results of the measurement of morphometric and morphological characteristics showed that there were differences in size and morphological characteristics of the types of fish found, indicating that stingray had different size ranges.

Keywords : Dasyatidae, Freshwater Stingray, Musi River, Morphometri

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1. Introduction

Stingrays belong to the class elasmobranchii and known as Batoid fish, which is a group of cartilaginous fish equipped with a long tail like a whip [1], but not fin-shaped. In general, at the base of the tail of the stingray there are one to five spines that have a poison gland tissue on the ventral side. Some types of stingrays or pari, the sharp spines are found on the ventral and dorsal parts [2]. The existence of sharp spines is what makes the stingray known as the Stingray or Stinging Thorn Fish. Stingrays doesn't hesitate to injure its opponent or paralyze its prey in a threatened condition, Even if the first aid is not immediately carried out, it is feared that it will cause death.

Information and references regarding the existence of the Dasyatidae family that live in the Musi river area are still very few. According to [3], the diversity of species of the Dasyatidae family is interesting to study further con-

sidering its potential that is not inferior to other economic fish species, therefore, data on biological aspects, as well as the potential of fish species from the family Dasyatidae in Indonesia, is important information to know. According to the research results of [4] found 7 species of stingrays that live along in Musi river area, namely, *Fluviatrygon kittipongi*, *Fluviatrygon signifer*, *Fluviatrygon oxyrincha*, *Fluviatrygon* sp 'musi' 1, *Fluviatrygon* sp 'musi' 2, *Pastinachus ater*, and *Urogymnus polylepis*. *Fluviatrygon* sp 'musi' 1 and *Fluviatrygon* sp 'musi' 2 which are stingray species that have just been recorded in the Musi river.

The Musi River is a place to live for various species of fish, one of which is from the Dasyatidae family. Musi river area in the city of Palembang are a bustling area with anthropological activities such as residential areas, household activities, ship crossings, industrial areas and other human activities. The Musi river area is rich in diversity of fish species, one of which is from the Dasyatidae family or Stingray.

2. Materials and Methods

A study of freshwater stingrays (Chondrichthyes: Dasyatidae) in Musi River of South Sumatra Province has been conducted during June to December 2020. The freshwater stingrays were collected in the Musi River

where located in the central of Palembang city (Capital of South Sumatra Province). Coordinates of location were documented in GPS (Figure 1, map of survey location).

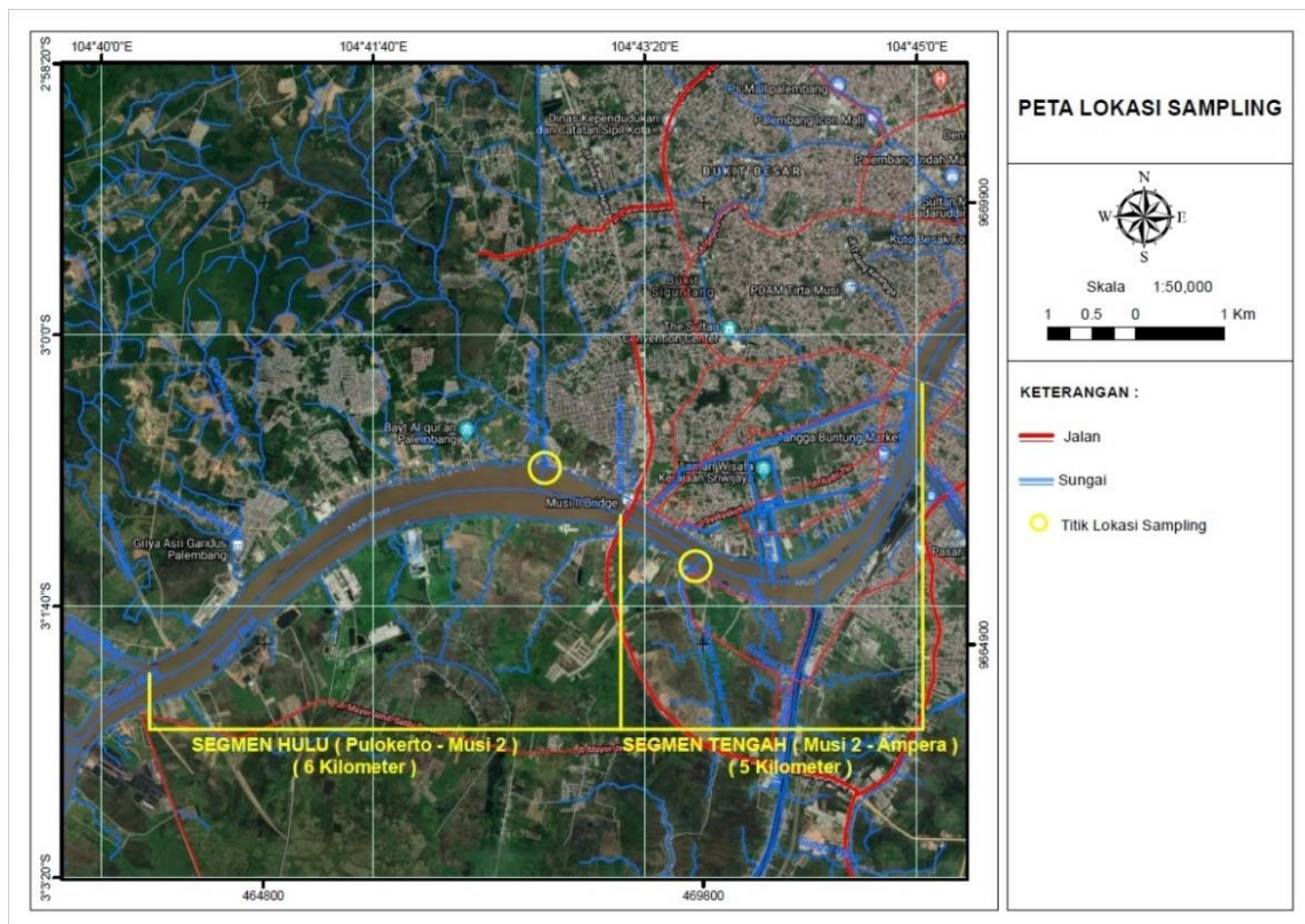


Figure 1. Map of study area (Musi River in Palembang, South Sumatra Province)

The location where specimens collected are Musi River near Musi Dua bridge within capital city of Palembang. There are two types of sampling of specimens. First, the fishes were caught using hook lines ; and the second type, use materials collected from local fishermen. The distance of specimens collection are 17 km, located from Musi Dua bridge to Kemaro island (°00'49.1"S, 104°42'43.1"E and °01'25.4"S 104°43'38.3"E).

Specimens were checked and measured in ecology laboratory of Department of Biology of Sriwijaya University, Indralaya, South Sumatra province. Sample of specimens were preserved using alcohol 90%, based on standard method to preserved fish specimens. The specimen were identified and measured used fishes identification guides [5]; [6]; [4]. There are 23 characters of stingrays to checked their

morphological characters (Table 1).

2. Results and Discussion

There are four species of freshwater stingrays collected in Musi River of South Sumatra province in Palembang city. The four species are *Fluivtrygon ox-yrhyncha*, *Fluivtrygon kittipongi*, *Fluivtrygon signifer*, dan *Fluivtrygon* sp 'musi' 2.

Morphometric and Morphological Data of Freshwater Stingray

The results of Morphometric measurements of freshwater stingray in Musi River area can be seen in the following table.

No	Species	Morfometry (cm)											
		Disc width	Disc length	Disc depth	Eye diameter	Eye-ball	Interorb. Width	Interorb. width	Mouth width	First gill slits	Fifth gill slits	Between first gill slits	Between fifth gill slits
1	<i>F. kittipongi</i>	39	40	5	0,4	1	5	2,5	4,5	1,2	0,6	9,5	6
	Rata-Rata	39	40	5	0,4	1	5	2,5	4,5	1,2	0,6	9,5	6
2	<i>F. signifer 1</i>	25	24	3	0,2	0,5	3,5	1,6	2	0,6	0,5	5,8	3,8
3	<i>F. signifer 2</i>	22,5	21	2,2	0,2	0,6	1,3	2,4	0,5	0,3	0,6	4,7	3,5
4	<i>F. signifer 3</i>	30	28	3,5	0,2	0,8	3,4	2,5	2	0,5	0,4	7	3,4
5	<i>F. signifer 4</i>	27	23	3	0,3	0,8	4	1,6	1,5	0,5	0,4	6	4
6	<i>F. signifer 5</i>	23,5	21	2,7	0,3	0,8	2,2	0,9	1,5	0,5	0,4	5	3,5
7	<i>F. signifer 6</i>	12	11	1	0,2	0,4	1,4	1,5	0,8	0,3	0,2	2,7	1,9
8	<i>F. signifer 7</i>	19	18	2,5	0,7	0,6	1,1	2,8	1,2	0,4	0,2	4	3
9	<i>F. signifer 8</i>	19	20	2	0,8	0,6	1,1	2,3	2	0,4	0,3	4	3
10	<i>F. signifer 9</i>	18	19	2,1	0,4	0,3	1	2	1,5	0,4	0,2	3,4	2,5
11	<i>F. signifer 10</i>	20	21	2,5	0,6	0,5	1,4	2,8	1,5	0,5	0,3	4,4	3
	Rata-Rata	23,2	22,4	2,7	0,4	0,6	2,3	2	1,7	0,5	0,4	5	3,4
12	<i>F. oxyrhyncha 1</i>	32	37,5	3,5	0,2	0,6	4,2	2	3,5	0,7	0,6	6,8	5
13	<i>F. oxyrhyncha 2</i>	30	31	3	0,2	0,9	4	2	3,5	1	0,8	7	4,8
	Average	31	34,2	3,2	0,2	0,7	4,1	2	3,5	0,8	0,7	6,9	4,9
14	<i>F. sp Musi 2</i>	33	39,5	3,7	0,2	0,6	4,3	2	3,6	0,8	0,7	6,9	5
	Average	33	39,5	3,7	0,2	0,6	4,3	2	3,6	0,8	0,7	6,9	5

No	Species	Morfometry (Cm)										
		Snout tip-eye	Snout tip-nostril	Snout tip-first gill slit	Snout tip-fifth gill slit	Snout tip-pelvic fin	Pelvic fin ant. margin	Pelvic fin post. margin	Tail length	Tail base width	Tail base depth	Tail to sting
1	<i>F. kittipongi</i>	14	12	19,5	24,5	37	5	9	110	4	3	15
	Rata-Rata	14	12	19,5	24,5	37	5	9	110	4	3	15
2	<i>F. signifer 1</i>	7	6	10,2	13,5	21,2	3	3,8	110	2,1	1,7	9
3	<i>F. signifer 2</i>	6,5	4,8	9	11,5	20	2,3	4,2	105	2	1,2	8
4	<i>F. signifer 3</i>	7	7,5	11	15	25	5	7	86	2,5	2	10
5	<i>F. signifer 4</i>	7	6	11	14	22	4	6	126	3	2,4	9
6	<i>F. signifer 5</i>	6	5,6	9	12,5	18,5	4	5	89	2,6	1,6	7
7	<i>F. signifer 6</i>	3	2,5	4,3	6,4	10	1,5	2,2	45,5	1	1	5
8	<i>F. signifer 7</i>	5,1	3,8	7	9,5	15	4,5	4	65	1,7	1,8	8,5
9	<i>F. signifer 8</i>	3,8	4	6	9	15	5	3,5	70	2	1,7	8
10	<i>F. signifer 9</i>	7	4	6,5	9	14,5	4	3,8	75	2	1,3	8
11	<i>F. signifer 10</i>	9,5	4	7,5	10	15	4,5	3,5	75	2	1,2	10
	Rata-Rata	6,9	5,5	9,2	12,3	19,4	3,9	4,7	86,9	2,3	1,7	8,9
12	<i>F. oxyrhyncha 1</i>	12,5	11	16,5	22	32,5	3,5	6,9	99	2,6	2,4	12
13	<i>F. oxyrhyncha 2</i>	11	9,5	15	19	28,5	4,5	7	92	3,5	2	10
	Average	11,7	10,2	15,7	20,5	30,5	4	6,9	95,5	3	2,2	11
14	<i>Fluivtrygon sp Musi 2</i>	14,5	13	18,5	24	34,5	3,5	6,9	102	2,8	2,6	13
	Average	14,5	13	18,5	24	34,5	3,5	6,9	102	2,8	2,6	13

Only one *Fluivtrygon kittipongi* was found in the upstream segment with a total length of 142 cm and female (no clasper). Based on the results of morphometric measurements, this fish has a disc width of 39 cm, a disc length of 40 cm and a disc thickness of 5 cm. At the head, the eye diameter is 0.4 cm, the eyeball is 1 cm, the interorbital width is 5 cm and the spiracle length is 2.5 cm. The results of measurements on the mouth, mouth length 4.5 cm, first gill slit 1.2 cm, fifth gill slit 0.6 cm, first gill slit distance 9.5 cm and fifth gill slit distance 6 cm. On the dorsal side the distance from the tip of the snout to the eyes is 14 cm, the distance from the snout to the nostril is 12 cm, the distance from the snout to the first gill is 19.5 cm, the distance from the snout to the fifth gill is 24.5 cm, the distance from the snout to the pelvic fins is 37 cm, the front pelvic fin is 5 cm, hind pelvic fin 9 cm. At the tail, the length of the tail is 110

the width of the base of the tail is 4 cm, the height of the tail is 3 cm and the distance of the base of the tail is 15 cm.

According to [7];[6];[8];[4] *Fluivtrygon kittipongi* is a very rare species, and has similar species with *Fluivtrygon signifer*. including the similarity of type habitats. This species is distinguished from *Fluivtrygon signifer* by the lack of conspicuous white margins, on the dorsal side, the presence of fine serrations on the tail after the sharp spines, and the edge on the ventral side has a black color.

Fluivtrygon kittipongi was first described to science in 2005 from specimens in Thailand under the name *Himantura kittipongi* [7]. Recent studies from the family Dasyatidae place the genus *Himantura* which generally lives in fresh water into the genus *Fluivtrygon*, including *Himantura kittipongi*, which is currently the

recognized name as *Fluivtrygon kittipongi* [9].

In this research, two *Fluivtrygon oxyrhyncha* were found in the middle segment. Based on the results of morphometric measurements, this fish has an average disc width of 31 cm, an average disc length of 34.2 cm and an average disc thickness of 3.2 cm. At the head the average eye diameter is 0.2 cm, the eyeball is 0.7 cm, the interorbital width is 4.1 cm, and the spiracle length is 2 cm. At the mouth the length of the mouth is 3.5 cm, the first gill slit is 0.8 cm, the fifth gill slit is an average of 0.7 cm, the first gill slit distance is 6.9 cm on average and the fifth gill slit is an average of 4, 9 cm. On the dorsal side, the distance from the tip of the snout to the eye is on average 11.7 cm, the distance from the snout to the nostril is an average of 10.2 cm, the distance from the snout to the first gill is on average 15.7 cm, the distance from the snout to the fifth gill is on average. 20.5 cm, average snout to pelvic fin distance 30.5 cm, average anterior pelvic fin 4 cm, posterior pelvic fin an average of 6.9 cm. At the tail, the average length of the tail is 95.5 cm, the width of the base of the tail is 3 cm on average, the height of the tail is on average 2.2 cm and the distance of the base of the tail sting is on average 11 cm. According to [4]; [6]; [7] *Fluivtrygon oxyrhyncha* has a total length of about 126 cm, and a body diameter of about 37 cm; newborn fish have a body diameter of 9 cm. ; the body is elongated, with a tapered snout; the proportion of the body is longer than its diameter; the tail is very long and thin; tail length about 3.0-3.6 times the width of the body; usually has only one hard spiked finger on its tail; small eyes and mouth; the dorsal surface is brownish and has a pattern with black spots; The tail pattern is the same as the body pattern. The species found in the Musi River have the same characteristics as the description above.

A total of 10 stingrays found were *Fluivtrygon signifer* ray species, with details of 6 found in the upstream segment and 4 found in the middle segment. From a number of samples found, there were 8 males and 2 females. *Fluivtrygon signifer* has a short snout, a long tail, and is characterized by having white edges on its body. This is in accordance with the opinion of [10], *Fluivtrygon signifer* has a long tail, which can reach three times its body length. *Fluivtrygon signifer* has morphological characteristics, namely the back is light brown with a contrasting color on the white edge of the body.

The results of morphometric measurements of 10 fish found, there were variations in fish size, these fish had disc widths ranging from 12-30 cm, disc lengths ranging from 11-28 cm and disc thickness ranging from 1-3,5 cm. At the head the eye diameter ranges from 0.2-0.8 cm, the eyeball ranges from 0.3-0.8 cm, the interorbital width ranges from 1-3,4 cm and the spiracle length ranges from 1.5-2, 8 cm. In the mouth, the length of the

mouth ranges from 0.5-2 cm, the first gill slit ranges from 0.3-0.6 cm, the fifth gill slit ranges from 0.2-0.6 cm, the first gill slit distance ranges from 2 ,7-5.8 cm and the distance of the fifth gill slit ranged from 1.9-3.8 cm. On the dorsal side, the distance from the tip of the snout to the eye ranges from 3 to 9.5 cm, the distance from the snout to the nose slit ranges from 4 to 7.5 cm, the distance from the snout to the first gills is on average 4.3-11 cm, the distance from the snout to the fifth gill ranges from 6.4-13.5 cm, the distance of the snout of the pelvic fins ranges from 10-25 cm, the front pelvic fins range from 1.5-5 cm, the rear pelvic fins range from 2.2-7 cm. In the tail, the length of the tail ranges from 45.5-110 cm, the width of the base of the lekor ranges from 1-2.6 cm, the thickness of the tail ranges from 1-2.4 cm and the distance from the base of the stinging tail ranges from 5-10 cm.

In *Fluivtrygon signifer* the difference between the length and width of the disc is not very striking, this is because this species has a short snout. In other species such as *Fluivtrygon kittipongi* , *Fluivtrygon oxyrhyncha* and *Fluivtrygon sp 'musi' 2* have a long snout so that the length of the disc and the width of the disc have a significant difference. The total length is obtained by adding up the length of the disc and the length of the tail. The average total length is 107.7 cm with a range between 85-147 cm. According to [5], a long tail with a whip on the tail is one of the characteristics of the Dasyatidae family which generally inhabits fresh waters.

Fluivtrygon sp musu 2 found in this study was female. This species has a long snout that is longer than *Fluivtrygon kittipongi* or, *Fluivtrygon oxyrhyncha*. According to [4] The most likely species is a new species that has never been described to science, and has a limited distribution in the Musi River, or at least in Sumatra. This species is characterized by a long, tapered snout. The color pattern on the dorsal side is similar to *Fluivtrygon kittipongi* and *Fluivtrygon signifer* but tends to be paler and the white margins are very thin. There is still not much data and information about *Fluivtrygon sp musu 2* so it is necessary to do further research that focuses on this species.

Based on the results of morphometric measurements, this fish has a disc width of 33 cm, a disc length of 39.5 cm and a disc thickness of 3.7 cm. At the head the eye diameter is 0.2 cm, the eyeball is 0.6 cm, the interorbital width is 4.3 cm and the spiracle length is 2 cm. At the mouth, the length of the mouth is 3.6 cm, the first gill slit is 0.8 cm, the fifth gill slit is 0.7 cm, the first gill slit is 6.9 cm and the fifth gill slit is 5 cm. On the dorsal side the distance from the tip of the snout to the eyes is 14.5 cm, the distance from the snout to the nostril is 13 cm, the distance from the snout to the first gill is 18.5 cm, the distance from the snout to the fifth gill is 24 cm, the distance from the snout to the pelvic fins is 34.5 cm,

the pelvic fins 3.5 cm front, 6.9 cm rear pelvic fins. At the tail, the length of the tail is 102 cm, the width of the base of the tail is 4 cm, the height of the tail is 2.8 cm and the distance of the base of the tail is 13 cm.

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