International Journal of Civil Engineering and Technology (IJCIET)
Volume 10, Issue 02, February 2019, pp. 2019-2026, Article ID: IJCIET_10_02_201
Available online at http://iaeme.com/Home/issue/IJCIET?Volume=10&Issue=2
ISSN Print: 0976-6308 and ISSN Online: 0976-6316

DOMINANT FISH GROWTH IN DIGOEL RIVER, EDERA DISTRICT, MAPPI REGENCY

Rosa Delima Pangaribuan, Marius Agustinus Welliken K., Norce Mote, Sendy Lely Merly and Nova Suryawati Monika

Department of Aquatic Resource Management, Faculty of Agriculture, Universitas Musamus, Merauke, Indonesia

ABSTRACT

This study aims to examine growth factors, namely the growth patterns of the dominant fish caught on the Digoel River, Edera District, Mappi Regency, by using a long-weight relationship index. This research was carried out from August to September 2017. The sample fish was obtained by stocking fishing gear, gill nets, fixed rawi, and spoon webs. The results of the study obtained dominant fish based on the number of catches namely species Parambassius gulliveri (141 tails), Kurtus gulliveri (100 tails) and Cinetodus crasslabris (97 tails). The pattern of fish growth is based on the catch of the three species of fish Parambassius gulliveri, Kurtus gulliveri and Cinetodus cassilabris are positive allometric which means that the weight gain is proportional to body length increase and the condition of fish conditions during the study is relatively small and is in the enlargement stage.

Keywords: Growth pattern, dominant fish, allometric

Cite this Article: Rosa Delima Pangaribuan, Marius Agustinus Welliken K., Norce Mote, Sendy Lely Merly and Nova Suryawati Monika, Dominant Fish Growth in Digoel River, Edera District, Mappi Regency, International Journal of Civil Engineering and Technology, 10(02), 2019, pp. 2019–2026

http://iaeme.com/Home/issue/IJCIET?Volume=10&Issue=2

1. INTRODUCTION

Digoel River which is located in Edera District, Mappi Regency has the potential of land fisheries of 27.48%, compared to its marine fisheries which is equal to 19.5%. Mappi District contributes to the potential of land fishery products to be limited to the Nambioman Bapai District. Data on fishing conducted by (Rarung and Pratasik, 2010) along the Digoel River.

The Mandobo River, the Mappi River there are as many as 23 species that inhabit the River. The 23 species that inhabit the Digoel River and these catches are usually consumed by local people such as fish "Gabus Rawa" (*Oxyleoris herwardenii)*, "Duri" (*Arius leptasp*), "Lele Ekor Cagak" (*A.carinatus*), "Lele Hitam" (*Clarias batrachus*), "Sambilan" (*Porochillus*

meraukensis), "Gabus Toraja" (*Barbodes goniotatus*), "Belanak" (*Mungil cephalus*), "Arwana" (*Scleropages jardinii*), "Kakap Putih" (*Lates calcarifer*), "Kakap Hitam" (*Hephaestus roemeri*), "Kakap Kembang" (*Glossamia sandei*), "Tawar" (*Nibea saldado*), "Gourame" (*Osphronemus goramy*), "Mas" (*Cyprinus carpio*), "Sumpit" (*Toxotes chatereus*), "Pogo" (*Paraambassis gulliver*), "Betik" (*Anabas tetudineus*), "Tulang-tulang" (*Thryssa rastrosa*), "Mata Bulan" (*Megalop cyprionides*), "Kaca" (*Kurtus gulliver*), "Mujair" (*Oreochromis mossambicus*), and "Nila" (*Oreochromis niloticus*). These fish species consist of native Papuan fish and the results of a fish introduction program in the past.

The growth pattern is known to get the weight of each individual fish length and fish frequency distribution (Effendie, 2002). Research on fish growth patterns is not yet available and it is deemed necessary so that the data can be a reference for the parties concerned in managing sustainable fisheries resources.

Utilization of the Digoel River as an area for fishing and transportation facilities that connect between districts in addition to environmental issues (Kotta et al., 2018; Razif et al., 2006) can cause a decline in population. To prevent this, management needs to be done and the information needed is the growth of dominant fish that includes growth patterns.

The research aimed at assessing fish growth is the pattern of growth found in the Digoel River, Edera District, Mappi District.

2. METHODOLOGY

The study was carried out on the Digoel River, Edera District, Mappi District. Map of research location can be seen in Figure 1. The study was carried out for 2 (months) from August to September 2017.

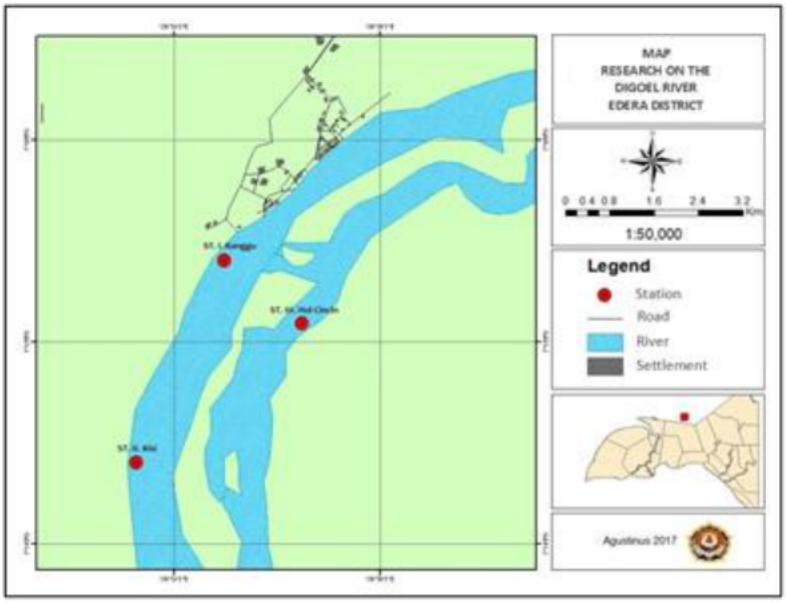

Figure 1. Map of Research Location Based on Three Station Determination

2.1. Equipments and materials

The tools and materials used during the research can be seen in table 1 below.

Table 1. Equipments and Materials

No.	Equipments and Materials	Use
1	Gill Net	For catching fish
2	Net	For catching fish
3	Longline	For catching fish
4	Serok Net (local named Tanggo)	For catching fish
5	Plastic Tray	To put down the fish sample based on species
6	Bucket	To fill in the fish sample
7	Styrofoam	To put down the fish then measure it
8	Calculator	To calculation the total lenght and weight of fish
9	Digital Scales Tools	To measure the weight of fish
10	Ruler	To measure the lenght of fish
11	Pen	To writing the result of observation and measurment
12	Tissue	To clean up the equipment
13	Camera	To taking a documentation while doing the research
14	Boat	For helping researcher going to every station and catching the fish
15	Fish	As a sample in this research

2.2. Data analysis

How to display the distribution of catches based on long-class hose is done with the help of Microsoft Office Exel software.

2.3. Dominance index

To find out the dominance of fish species is determined using a dominance index (Odum, 1971).

$$\mathbf{C} = \sum \frac{\mathbf{ni}}{\boldsymbol{N}}$$

where:

ni : Number of individuals of n

N : Number of all individuals

The dominance index value ranges from 0 - 1. Where if the dominance index approaches 0, it can be said that there is no dominating type and a high level of uniformity. But if the dominance index approaches the value of 1, then there is one type that dominates and its uniformity is small (Odum, 1997).

2.4. Long and heavy relationship

Analysis of the relationship between the length of fish weight was carried out using the long weight relationship formula (Effendie, 1979).

$W = aL^b$

where:

W : Body weight (g)

L : Total length (mm)

a and b are constants

The value of b obtained is used to predict whether the growth patterns include isometric (b = 3) or allometric (b ≠ 3), then carried out through the t test (Effendie, 1979). The closeness of the relationship between the length and weight of the fish is indicated by the correlation coefficient (r) obtained, if close to 1 indicates the relationship between the two is strong and there is a high correlation, on the other hand, when close to 0 the relationship is very weak or almost non-existent.

3. RESULTS AND DISCUSSION

3.1. Growth pattern

The most dominant fish growth pattern in catches in the Digoel River is calculated based on long-term hose relationships and long heavy relationships.

3.2. Long fish hose Parambassis gulliveri

Fish research results *Parambassis gulliveri* which was captured during the study amounted to 141 fish consisting of 50 male fish and 91 female fish. The distribution of fish species can be seen in Figure 2 below.

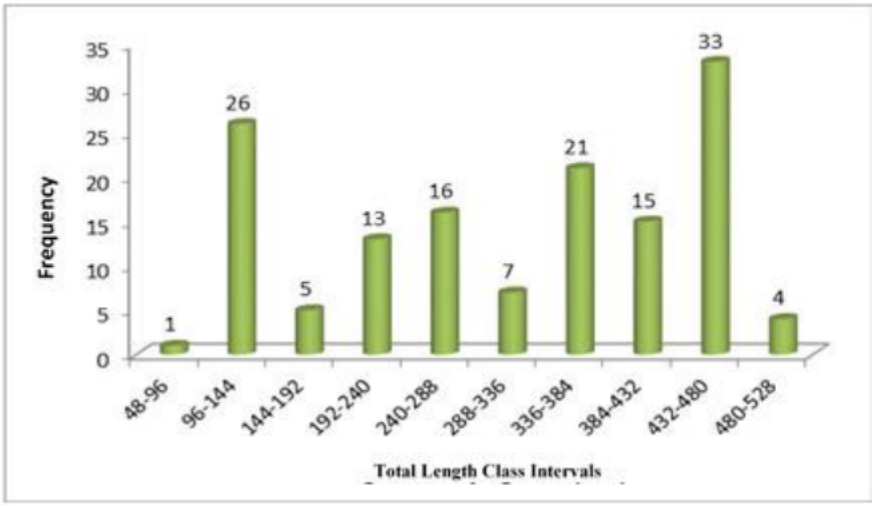

Figure 2. Total length class intervals of fish (mm).

Based on the graph data shows that the temporal distribution of fish *Parambassis gulliveri* caught during the study period shows that the hose data for the long class of male and female fish shows a significant variation in the value of = 48-528 mm. The size of the longest class that is most caught is size 432-480 mm.

3.3. Relationship between length and weight of fish *Parambassis gulliveri*

Hubungan panjang dan berat ikan *Parambassis gulliveri* menunjukkan nilai panjang berat ikan betina nilai W = 0, 7605 ,R^2 = 0,9494 dan ikan jantan nilai W = 0,7605 R^2 = 0,9404 atau mendekati nilai 1 bisa di lihat pada gambar 3 dibawah ini.

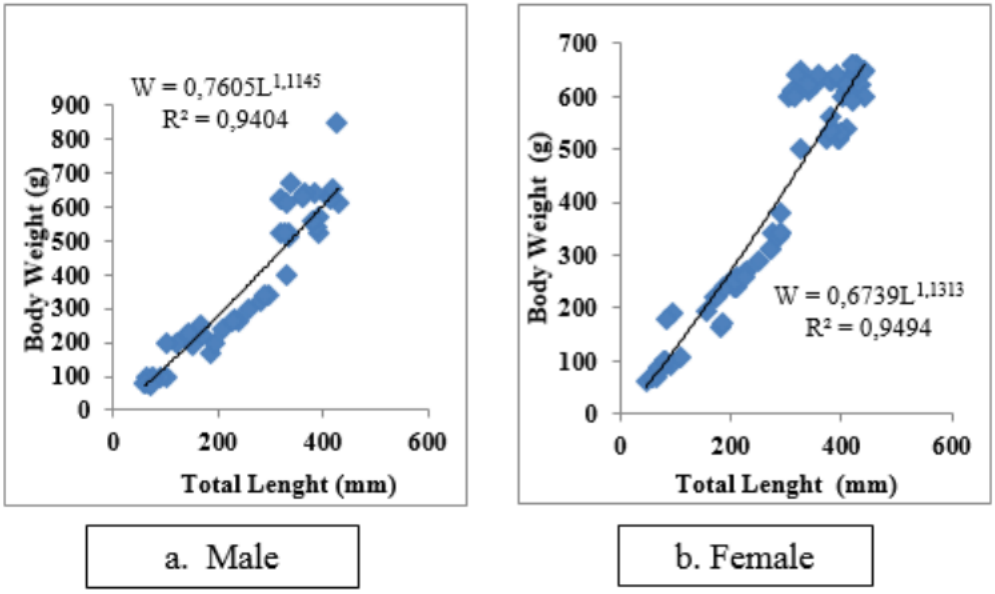

Figure 3. Chart of *Parambassis gulliveri* lenght and weight relationship

The results of the calculation of the relationship of length and weight of female fish regression coefficient (b) = 1.1313 then the value of tcount 30.1323. The ttable value is 1.98 then male fish (b) = 1.1145 then the value of t arithmetic = 20.72 and t table = 2.01 based on the results of t test on b in male and female fish obtained value of t count <from ttable so positive allometric growth pattern was obtained (b <3) which means fish length increase was slower than its weight growth. The same growth pattern was also found in the research at the Sungai Kumbe Estuary (Gebze and Latupeirissa, 2017) which is allometric positive.

3.4. Long fish hose *Kurtus gulliveri*

Fish research results *Kurtus gulliveri* 2017 caught in fishing gear during the study amounted to 100 fish consisting of 38 male fish and 62 female fish. The distribution of fish species for more details can be seen in Figure 4 below.

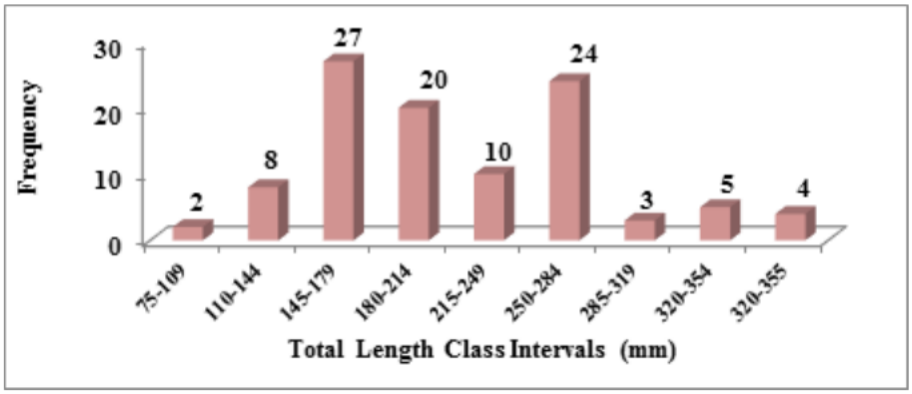

Figure 4. Chart distribution of catch result Kurtus gulliveri based on Total length class intervals (mm)

Based on data on the distribution of fish catches, the highest distribution value = 75-109 mm and the highest = 145-179 mm. Froese (2006) said that in general it was shown that petek fish was compressed, the same body shape found in fish in the field at the time of sampling was thought to increase the weight of fish not only due to the increase in length, but also due to the increase in height body, so as not to show a plump body shape.

3.5. Relationship between length and weight of fish *Kurtus gulliveri*

The relationship of the length of the weight of the fish *Turtus gulliveri* is the relation between the length of weight W in male fish = 2,2436, R^2 = 0,8071 and female W = 3,4927, R2 = 0,8711 does not approach the value 1 for more details can be seen in Figure 5 in below this.

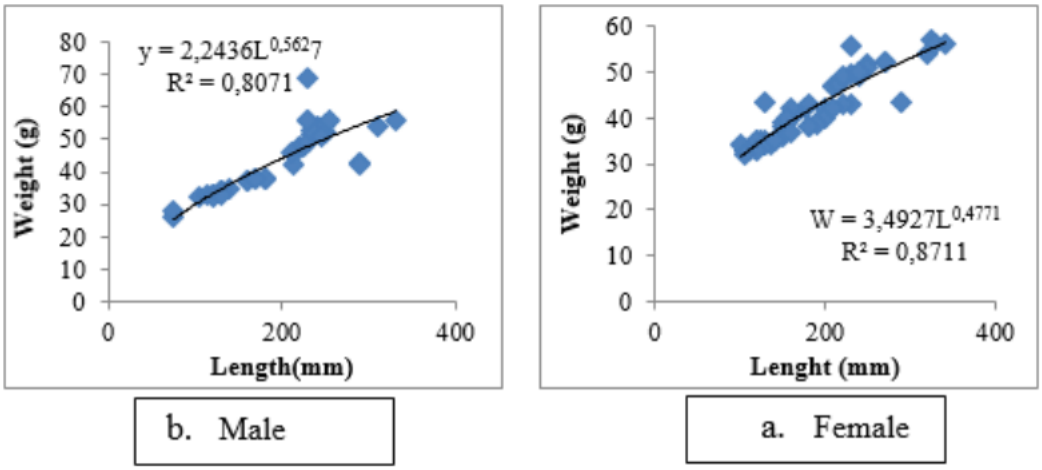

Figure 5. Chart of *Kurtus gulliveri* lenght and weight relationship

The male fish coefficient test results show that b = 0.5627 and the results of t test = 9.88 and t table = 2.02 then female fish b = 0.4771 or regression coefficient (b) male and female fish obtained t count value <from the table then the value of r2 in male fish shows the value (r) is not close to the value 1 so there is no strong relationship between the relationship of length and weight, but the t-test and t-count values indicate that the allometric growth pattern is positive because of the growth of more fish slow compared to its weight. Unlike the case with the data reported (Djadja and Saadah, 2001) in *Leiognathus sp*. fish obtained an isometric growth pattern, but the value of b both tend to be close to 3 (isometric).

3.6. Long fish hose Cinetodus crassilabris

Fish catch *Cinetodus crassilabris* 2017 of 97 fish consisted of 30 male fish and 67 female fish. To be more clearly about the distribution of fish species can be seen in Figure 6 below.

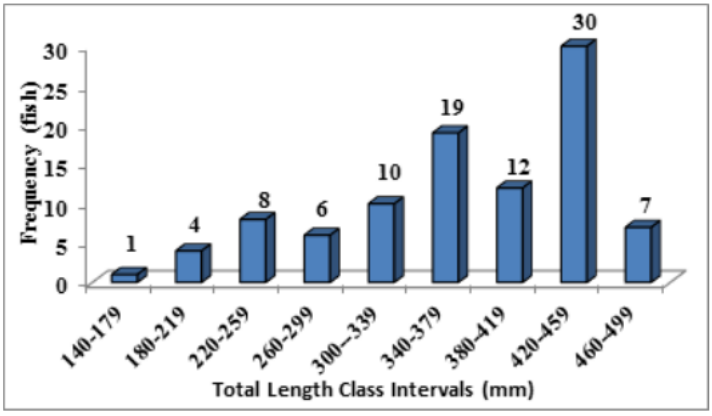

Figure 6. Chart distribution of catch result Cinetodus cassilabris based on total length class intervals (mm)

Based on data from the total length of the hose class on the distribution of catches, it shows the class hose between 140-179 mm and 420-459 mm. Then the value of male fish count = 13.05 and t table2.04 then t count for female 20, 32 and t table = 2.00.

3.7. Relationship between length and weight of fish *Cinetodus cassilabris*

The relationship of the length of weight of *Cinetodus cassilabris* fish species, W in male fish = 3.06, R^2 = 0.9102 and female W = 3.51, R2 = 0.8657 for more clearly see in Figure 7 below.

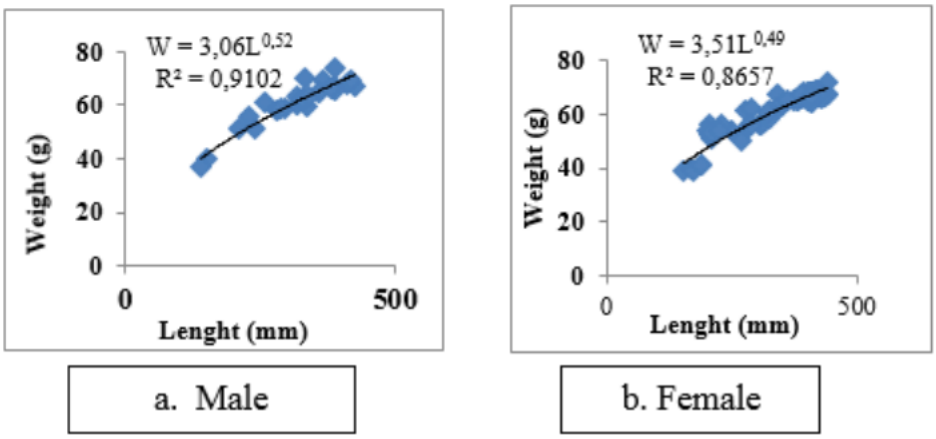

Figure 7. Chart of *Cinetodus cassilabris* lenght and weight relationship

The test results of the coefficient "b" to 3 indicate that "b" is different from 3, and the results of the t test show that the value of t is greater than t table so the value of b differs from the 3 regression coefficient (b) male and female fish are allometric positive (b <3) but in the R2 correlation coefficient value of male and female fish showing numbers close to 1 or -1, it can be concluded that male and female *Cinetodus crassilabris* have a strong relationship between length and weight, and there is a high correlation supported by the opinion of Walpole (1995), explaining that the value of the correlation coefficient (r) approaches 1 or -1 then shows a linear relationship between the two variables.

4. CONCLUSION

Based on the results of data analysis shows the pattern of fish growth from the three fish species *Parambassis gulliveri, Kurtus gulliveri* and *Cinetodus crassilabris* are positive allometric, which means that the weight gain is proportional to the increase in body length.

REFERENCES

[1] Djadja, S.S., Saadah. 2001. Beberapa aspek biologi ikan petek, Leioghnathussplendens cuvier di perairan Teluk Labuan, Banten. Jurnal Ikhtiologi Indonesia. 1(1): 13-17.

[2] Djamali, R.A., Betaubun, P. 2018. Design of Agroindustry Development Strategy Based on Fisheries Cacthe of Merauke Regency. IOP Conference Series: Earth and Environmental Science 207 012016.

[3] Effendie, M I. 1979. Metode Biologi Perikanan. Yayasan Dewi Sri. Bogor. 112 h.

[4] Effendie, M.I. 2002. Biologi Perikanan.Yayasan Pustaka Nusatama,Yogyakarta. 163 h.

[5] Froese R. 2006. Cube law, condition factor and weight-length relatoinship: history, meta-analysis and reccomendations. *J. Appl. Ichthyol*. 22:241-253.

[6] Gebze, K. A. dan Irianis Latupeirissa. 2017. Pertumbuhan Ikan Kuro (*Eleutheronema tetradactylum* Shaw, 1804). Di Muara Sungai Kumbe Kabupaten Merauke.

[7] Kotta H., Mangkoedihardjo, S., Ludang, Y., Trisutomo, S. 2018. The design of riparian zone in waterfront area of Tanjung Bunga, Makassar. International Journal of Civil Engineering and Technology, 9(8): 580–584.

[8] Marius Agustinus Welliken K. and Edy H.P. Melmambessy, 2018. Distribution Patterns of Chlorofil-A and Sea Surface Temperature Using Aqua-Modis Satellite Images in the Arafura Sea, International Journal of Civil Engineering and Technology, 9(12), pp. 939–948.

[9] Odum,E.P. 1997. Dasar-dasar Ekologi. Alim Bahasa. Cahyono, S. FMIPA IPB. Gajah Mada Univerciti Press. 625p.

[10] Rarung. L. K. And S. B. Pratasik, 2010. Potensi jenis-jenis ikan air tawar komsumsi masyarakat aliran Sungai Digoel, Kabupaten Boven Digoel, Papua, dan beberapa langkah pengelolaannya.

[11] Razif, M., Budiarti, V.E., Mangkoedihardjo, S. 2006. Appropriate fermentation process for tapioca's wastewater in Indonesia. Journal of Applied Sciences, 6(13), 2846-2848.

[12] Suyadi, Pamuttu, D.L., Hairulla, Betaubun, P. 2018. Ant nest (Musamus) as an additional material of engineered soil stabilisation using soil cement. International Journal of Civil Engineering and Technology, 9(12), pp. 918–925.

[13] Walpole, R.E. 1995. Pengantar Statistika edisi Ke-3 alih Bahasa oleh Sumantri, B. PT Gramedia Pustaka Utama. Jakarta. 515 hal.