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POTENTIAL TYPES OF CRICKET BAIT (*Acheta domesticus*) ON FISH CATCH RESULTS USING FISHING RODS IN THE SWAMP WATERS OF KAMPUNG WASUR

Potensi Jenis Umpan Jangkrik (*Acheta domesticus*) Terhadap Hasil Tangkapan Ikan Dengan Menggunakan Pancing Joran Di Perairan Rawa Kampung Wasur

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ABSTRACT

The dynamics of swamp waters are developing very rapidly in terms of fulfilling the economic needs of the community to support prosperity. Fishing activities are one aspect of realizing these needs. Therefore, this research aims to find alternative fish bait in the swamp of Wasur Village, Merauke Regency, South Papua. Crickets (Acheta domesticus) were chosen as an alternative bait because they are still related to traditional bait, namely kroto. This research was conducted for three months (July-September 2023) using quantitative descriptive methods. The fishing technique used is using a fishing rod as is often used by the local community so that it is easy to adopt later. The research results showed that the two most dominant fish species caught were Climbing perch (Anabas testudineus) and Snakehead fish (Channa striata). There were 60 Climbing perch caught, while 42 snakehead fish were caught. Analysis of the relationship between length and weight shows that both fish species have negative allometric growth patterns. This means that the increase in body length of the fish is faster than the increase in weight. Crickets have been proven to be an effective alternative fish bait in the Kampung Wasur swamp.

Keywords: Climbing perch, Snakehead, Merauke, Wasur Swamp, Cricket Bait

ABSTRAK

Dinamika perairan rawa sangat pesat perkembangannya dalam hal pemenuhan kebutuhan ekonomi masyarakat untuk menunjang kesejahteraan. Aktivitas penangkapan ikan merupakan salah satu aspek untuk mewujudkan kebutuhan yang dimaksud. Maka dari itu, tujuan dari penelitian ini yaitu untuk mencari alternatif umpan ikan terlebih khusus di rawa Kampung Wasur, Kabupaten Merauke, Papua Selatan. Jangkrik (*Acheta domesticus*) dipilih sebagai alternatif umpan karena masih memiliki hubungan dengan umpan tradisional yaitu kroto. Penelitian ini dilakukan selama tiga bulan (Juli-September 2023) dengan menggunakan metode

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deskriptif kuantitatif. Teknik penangkapan yang digunakan yaitu memakai pancing joran sebagaimana yang sering digunakan oleh masyarakat sekitar agar mudah diadopsi nantinya. Hasil penelitian menunjukkan bahwa dua spesies ikan yang paling dominan tertangkap adalah ikan Betok (*Anabas testudineus*) dan ikan Gabus (*Channa striata*). Ikan Betok tertangkap sebanyak 60 ekor, sedangkan ikan Gabus sebanyak 42 ekor. Analisis hubungan panjang berat menunjukkan bahwa kedua spesies ikan tersebut memiliki pola pertumbuhan allometrik negatif. Hal ini berarti bahwa pertambahan panjang tubuh ikan lebih cepat dibandingkan dengan pertambahan beratnya. Jangkrik terbukti dapat menjadi alternatif umpan ikan yang efektif di rawa Kampung Wasur.

Kata Kunci: Ikan Betok, Ikan Gabus, Merauke, Rawa Wasur, Umpan Jangkrik

INTRODUCTION

Swamps are public waters that have the characteristic of different water levels during the dry season and the rainy season or part of a river basin (DAS), areas that are open and closed at certain times, such as large, medium, or small lakes and vary according to the season. Economically, the existence of swamps is very necessary for humans to find fish, because in these waters there are various types of fish for consumption (Rusmilyansari et al., 2021). No exception to the swamp waters owned by Merauke Regency, especially in Wasur Village. Various types of fish that have high economic value include Arowana (Scleropages jardinii), Gabus (Channa striata), Striped snapper (Amniataba affinis), Betok (Anabas testudineus), Bulanak (Mugil chepalus), Bambit (Selenotoca papuensis). In addition, there are other types such as Duri fish (Arius sp.), Catfish (Clarias sp.), Tilapia (Oreochromis sp.). Even the Betok fish, although an introduced fish in the Merauke area, is the fish most often caught in swamp waters, especially in the Wasur waters. So it is not surprising that the Wasur swamp waters are nicknamed the Serengeti of Papua (Mote et al., 2022; Sutrisno, 2021).

The utilization of fishery resources in the Wasur village swamp is carried out using a fishing system, namely by obtaining fish using fishing gear. In general, local people often use fishing gear in the form of nets, nets, traditional fishing rods, and traps. Along with the increasing population growth rate and the problems of life's needs, people are encouraged to utilize existing fishery resources optimally and continuously (Limbong, 2018).

The optimality of a fish utilization activity must be supported by the method and availability of equipment or aids in fishing, for example the type of bait and fishing gear. The type of bait has a significant effect on the catch that will be obtained by the community. Bait provides physical and chemical stimuli that can provide a response for certain fish during the fishing process. In general, freshwater fish detect their food using chemical stimuli through their olfactory system to detect the presence of reduced proteins and amino acids (Aldita et al., 2014; Putra et al., 2015). One type of bait that is often used by local people is ants or ant eggs (kroto). People use this type of bait to catch freshwater predator fish including Gabus and Betok. However, the availability of the type of bait in question is not always available throughout the season but is only available in certain seasons. Therefore, the purpose of this study is to find alternative types of bait so that people can continue to optimize their catches in order to meet their needs. The type of bait chosen is crickets (Acheta domesticus), where the bait is still closely related to kroto bait, namely insects.

METHODS

The research location was carried out in one of the swamp waters in Wasur Village, Merauke Regency, South Papua Province with a geographical position of 8 ° 30'10.08 "LS & 140 ° 28'8.39" BT. Where data collection was carried out from July to September 2023. The fishing gear used during data collection was 4 pole and line (tegek rods). The specifications of

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the fishing gear are as follows: 1) 300 cm long rod made of a mixture of fiberglass and graphite, 2) 290 cm long main line made of PE (polyethylene) thread, 3) 10 cm long leader line made of nylon, and 4) 6 mm wide and 10.20 mm long fishing hook. The series used to catch fish uses one hook with the type of bait used, namely crickets (*Acheta domesticus*).

The research method used is a quantitative descriptive approach. Where the data on the number, weight, and length of fish are used to describe, show or summarize in a constructive way that refers to statistical descriptions so as to understand the details in finding patterns from certain data samples (Sudirman et al., 2023). The data analysis used is the relationship between length and weight and condition factors. This analysis is used to determine whether the growth of fish caught is isometric or allometric. The following is a general equation used to calculate length and weight (Effendie, 2002):

$$W=aL^b$$

Description:
W = Fish weight (g)
L = Total length of fish (mm)
a and b = constants

The linear form of the equation used is:

$$\text{Log } W=\log a + b \log L$$

The relationship between length and weight is based on primary data in the form of fish length and weight, then arranged in a table of the range between fish body length and weight. Meanwhile, for the analysis of condition factors, for fish with allometric growth, the condition factor is calculated using the relative condition factor, namely with the following formula (Merly & Pane, 2021):

$$Kn = W/(aL^b)$$

Description:
W = Total weight (g)
aL^b = length-weight relationship.

RESULT

Based on the results of the fishing operation that has been carried out for three consecutive months, two species of swamp fish were found, namely the Betok fish (Anabas testudineus) and the Snakehead fish (Channa striata). Where the Betok fish species is the most dominant species caught with a total of 60 fish, followed by the Snakehead fish as many as 42 fish (Figure 1). The following is the percentage of catch results based on species during the three-month fishing operation in a row.

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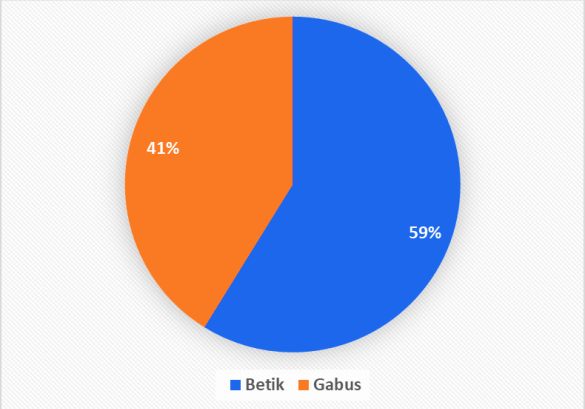

Figure 1. Catch Results Based on Species

In July, the Betok fish was the most commonly caught species, with 28 fish, followed by the Snakehead fish with 16 fish. However, the number decreased in August, with 11 Betok fish and 8 Snakehead fish. However, in September, the number of catches increased with 21 Betok fish and 18 Snakehead fish (Figure 1). In contrast to the number, the catch based on fish weight showed that the Snakehead fish dominated throughout the month. In July, the weight of the Snakehead fish caught reached 5,161.77 grams, followed by the Snakehead fish with 2,190.67 grams. However, the same was true for the number of catches in August. The weight of the catch in that month was 1,492.85 grams of Snakehead fish and 956.44 grams of Snakehead fish. In September, there was an increase, with the Snakehead fish still dominating with a weight of 4,654.9 grams, followed by the Snakehead fish with 2,156.89 grams.

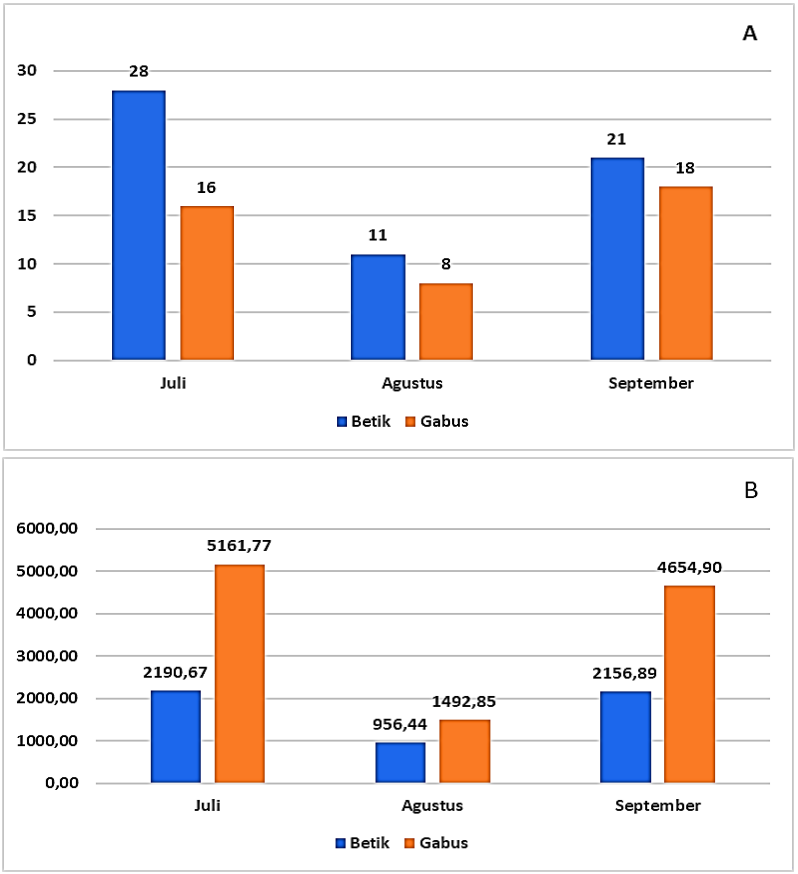

Figure 2. Fish Catch Results Based on Quantity (A) and Weight (B)

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Analysis of the Relationship between Length and Weight of Betok Fish

Betik fish (Anabas testudineus) in Indonesia is better known as Betok fish and Papuyu fish, is a fish included in the Anabantidae family of the Anabas genus. During the 3-month research period, the number of individuals caught was 60. The largest number of fish was caught in July, 28 (length range 10.5-16.9 cm and weight 50.0-119.0 gr), followed by September 21 (length range 11.5-17.0 cm and weight 50.0-119.0 gr) and the least in August, only 11 fish were obtained with a length range of 12.5-17.5 cm and weight 37.0, 0-105.0 gr. The analysis of the relationship between the length and weight of Betik fish can be seen in Figure 3.

The figure shows that the equation for Betik fish is W = 1.28L1.59 so that it has a constant b value of 1.59. This shows that the results of the analysis of the relationship between the length and weight of the betik fish are less than three (<3), meaning that it is categorized as having a negative allometric growth pattern.

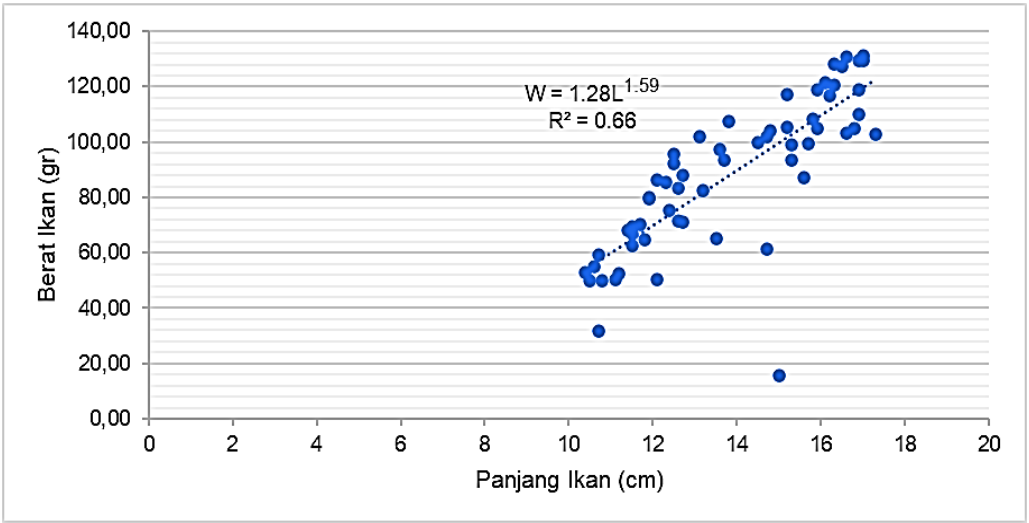

Figure 3. Relationship between Length and Weight of Betok Fish (July-September 2023)

Meanwhile, for the determination coefficient value (R2) shown in Figure 3, it can be seen that there is a fairly strong one stated with an R2 value of 0.66 or 66% of the increase in the weight of this betik fish is influenced by the increase in the length of the fish, while the other 34% is influenced by other factors.

Analysis of the Relationship between Length and Weight of Snakehead Fish

The presence of Snakehead fish (*C. striata*) that were successfully caught during the research period in July-September 2023 amounted to 34 fish. In the first sampling in July, 16 Snakehead fish were obtained with a length range of 16.5-46.0 cm weighing 97-483 gr. The second sampling in August, the number of fish caught decreased to 8 fish with a length ranging from 19.8 - 50.7 cm and a body weight between 63.0 - 320.10 gr. Meanwhile, in the third month, namely September, there was an increase in the number of catches, namely 18 fish with a length range of 14.0-46.2 cm and a body weight of 90.0 - 395.0 gr. The complete relationship between the length and weight of the Snakehead fish during the 3 months of sampling is clearly seen in Figure 4 below.

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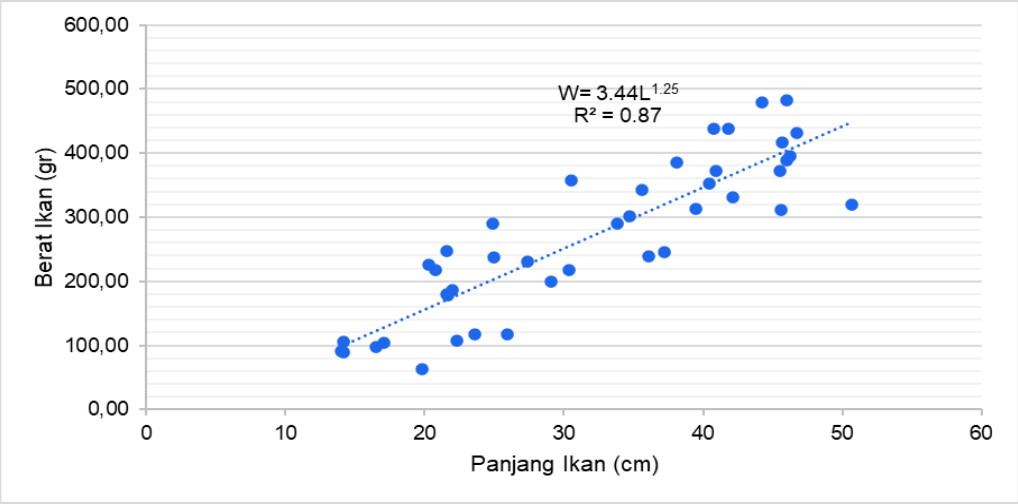

Figure 4. Relationship between Length and Weight of Snakehead Fish (July-September 2023)

Based on the image above, it is known that the growth of the Snakehead fish has a negative allometric growth pattern where the constant value b <3 is 1.25. This also means that the increase in body length of the Snakehead fish tends to be faster than the increase in weight. Meanwhile, the coefficient of determination (R2) value of 0.87 shows that 87% of the weight gain in the Gastor fish is caused by the increase in fish length, while the other 13% is influenced by other factors.

Condition Factors of Betik Fish and Snakehead Fish

Condition factor analysis is used as an effective instrument in showing changes in fish conditions by describing the plumpness of the fish. Based on Table 1 and Figure 5, it can be seen that the Betok fish are grouped into 7 class interval categories. The class interval length category 2 (11.5-12.5 cm) and category 7 (17.0-18.0 cm) are categories with the highest number of presence frequencies reaching 10 individuals each, while the class interval length 13.7-14.7 cm, namely category 4, is known as the category with the lowest frequency of presence. The average condition factor of the betik fish is between 0.9114 and 1.1462. The following is the interval of the length class and the condition factor of the Betok fish.

Table 1. Length Class Interval and Condition Factor (FK) of Betok Fish

Category	Long Class Hose (cm)	Frequency of Attendance	Average Condition Factor
1	10.4-11.4	9	0.9114
2	11.5-12.5	10	1.0834
3	12.6-13.6	9	1.1462
4	13.7-14.7	4	1.0953
5	14.8-15.8	9	0.9239
6	15.9-16.9	9	1.0480
7	17.0-18.0	10	1.0263

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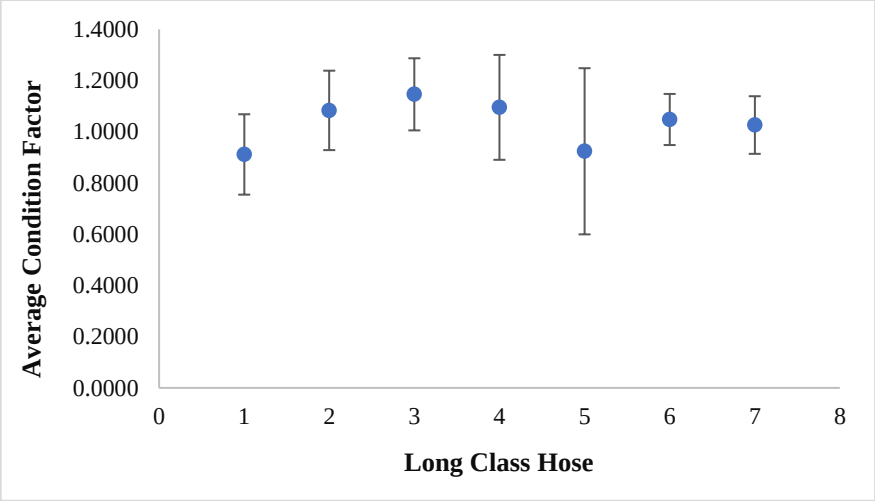

Gambar 1. Faktor Kondisi Total Ikan Betik

DISCUSSION

The catch was in accordance with initial predictions, namely that the swamp waters around Wasur National Park mainly consisted of climbing perch and snakehead fish. The climbing perch is one of the most common freshwater fish in Merauke. Fish are very suitable for many public water ecosystems, especially those exposed to flooding such as swamps, rivers, lakes, and rice fields due to their extraordinary adaptability (Pane et al., 2023; Prianto et al., 2014).

According to Nurdawati et al. (2019), climbing perch is one of the most common fish in flood-exposed ecosystems, in this case in Lubuk Lampam. The abundance of these fish is very high in this ecosystem, which allows for catching and contributing income to the surrounding community. It is further explained that climbing perch eats bottom fish, as well as plant and animal fragments.

Likewise with the snakehead fish, according to (Dahlia et al., 2022) that freshwater fish from the Channidae family consist of two genera, namely Channa and Parachanna. The Channa genus is widely found in Asia, while the Parachanna genus is widely found in Africa. Currently, there are 39 species of Channa fish and 3 species of Parachanna. In Indonesia, at least eight species of Channa fish have been identified: Channa striata (snakehead fish), Channa micropeltes (toman fish), Channa lucius (bujuk fish), Channa pleurophthalmus (seradang fish), Channa marulioides (jalai fish), Channa maculate (mihau fish), Channa bankanensis, and Channa cyanospilos (seradang fish). The level of selectivity in fishing rod fishing gear is also an indicator of the sustainability of fish resources. According to Dewi et al. (2020), fishing selectivity can be measured from the size of the hook used. The community in the Nilo River, Merangin Regency always uses fishing rod fishing gear to catch fish. The estimated selectivity value for hook size no. 1 is 16.537 cm long and hook size no. 3 is 20.691 cm long. The length of the fish caught that has an outer length below and above the estimated selectivity value is unlikely to take the bait.

The chemical content of the bait is one of the factors that determines how effective the bait fishing technique is. Different types of bait affect the odor emitted by the chemical content of the bait, which is part of the protein chain. Chemical signals transmit information between animals. The organs that receive these signals are the olfactory and gustatory organs. Similar to land animals, fish also have chemical signals known as allomones and pheromones. Allomones and pheromones are secreted and sent to olfactory receptors to trigger certain reactions. Allomones are chemical intermediaries that change to attack or protect members of

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different species. In contrast, pheromones react quickly between members of the same species (Aldita et al., 2014; Putra et al., 2015).

According to (Bakhtiar et al., 2014), bait containing fat will produce better catches because it stimulates the fish's sense of smell more strongly. For active fishing gear, the bait must have an odor and color that matches the target fish. Therefore, it is not surprising that the type of insect or cricket bait can be used to get the best catch.

A similar thing was reported by Pickova (2018), that Orthoptera species, including Acheta domesticus, are rich in protein and are globally an alternative source of protein. The crude protein content of this house cricket reaches 66.6% in total body when compared to beef, pork, chicken, salmon, and milk, having a much higher protein concentration.

Similar to other types of crickets, namely Gryllus bimaculatus, also known as the two-spotted cricket, is one of the most abundant cricket species that can be found in tropical and subtropical areas of Asia, Africa, and Europe (Peh et al., 2008). Easy to breed and commonly given as bait or pet food (Lange & Nakamura, 2021). Although there is still not much published information regarding the potential use of black crickets for feed production, black crickets are reported to contain 57% crude protein and a high fat content of 25%. With these aspects, Gryllus bimaculatus has great potential to be used as an alternative protein source and bait for fishing. Indeed, black crickets can replace up to 100% of the protein in the food of African catfish (Clarias gariepinus) fry, without adverse effects on fish antioxidant enzyme activity, hematological responses, nutrient and amino acid digestibility, and growth performance (Taufek et al., 2013).

According to Mustakim et al. (2009) Anabas testudineus in each habitat has a different growth pattern, namely Isometric and Allometric in swamp waters, while in rivers it tends to have an Allometric pattern. This means that habitat conditions are also a determining factor in the growth of fish including Betik fish found in the Rawa Kampung Wasur Waters.

In line with this, Fauzi et al. (2022) through research in Lake Tuok Tonga, Riau revealed that Betik fish in this lake have a Negative Allometric growth pattern with constant b values of 2.6452 and 2.5211 respectively. Furthermore, Virdayanti et al. (2021) concluded that fish commonly caught in the Tungkaran Village Swamp, South Kalimantan, including Snakehead fish, Siamese gourami and Betik fish are dominated by negative allometric growth patterns where the increase in body length of the fish is faster than the increase in body weight.

In line with the relationship between the length and weight of the Snakehead fish, this is reinforced by research (Muthmainnah, 2013) in Rawa Lebak Sekayu and Khan et al. (2017) in the Ganges River, India, which has Negative Allometric growth of Snakehead fish. However, this finding is different from similar studies conducted by (Shasia et al., 2021) in Teluk Petai Lake and Nainggolan et al. (2019) in Sei Paku Reservoir, Riau where the constant b value ranges from 3.0580-3.1651 so that the growth pattern is categorized as Positive Allometric. Differences in water conditions and types result in different growth patterns of Gastor fish. Current water conditions such as rivers can have an impact on Gastor fish whose bodies become thinner than fish found in lakes. Nursihan et al. (2020) revealed that water height is a factor in the success of Snakehead fish life and affects specific growth increases. The optimal water height for the growth of Snakehead fish ranges from 3-5 cm. The swamp waters in Wasur Village have a water discharge height of more than 10 cm, although it does not have a strong current like in a river, with a water pH range of 4.0-5.2 and water temperature in 3 months of observation between 30.5-35.0 0C, these factors also affect both the abundance of individuals and the growth patterns of the Snakehead fish. According to Windarti (2020) an r value approaching 1 indicates a strong relationship between the length and weight of the fish. This is thought to be related to supportive water conditions such as food availability and ideal environmental parameters.

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Effedie (1997) in Ibrahim et al. (2017) revealed that the value of the condition factor that is indicated as good is in the range of 1-3 with a less flat body shape. Betik fish with an average value of this condition factor is classified as a fish with a less flat body shape. This is in line with Maturbongs et al. (2022) in Betok fish in Kembapi Payau Swamp has an average condition factor range between 0.1829 - 1.5774 and is classified as flat, where the condition factor value in this study is still included in the existing range.

According to Shasia (2021) and Aisya et al. (2017) the difference in the value of the condition factor of this snakehead fish is due to variations in the range of length and weight of the snakehead fish, where this variation is also influenced by the spawning period of the Snakehead fish. Other influencing factors such as population density, food, sex, age of fish and gonad maturity (Gustiarisanie et al., 2016). Rahardjo & Simanjuntak (2008) added that fish such as Johnius belangerii the condition factor value will increase towards the peak of spawning and decrease after spawning takes place.

CONCLUSION

The type of cricket bait has been proven to be effective as an alternative bait for catching Betok and Gabus fish in the swamp waters of Kampung Wasur. The negative allometric growth pattern in both fish species shows a faster increase in body length compared to body weight. While condition factors are influenced by length, weight, population density, food, sex, age of fish, and gonad maturity.

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