

REPRODUCTIVE BIOLOGY OF *BELONTIA HASSELTII* FROM THE TAMBANG VILLAGE, KAMPAR REGENCY, RIAU

oleh:
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Abstract

Belontia hasselti is belonged to Belontiade family and commonly inhabit flood area and irrigation canals in palm tree plantation areas in Riau. This fish is commonly consumed by local people or reared as aquarium fish. However, information on reproductive biology of this fish is rare. To understand the reproductive biology of this fish, a research has been conducted on February-April 2012. There were 123 fishes (102 males and 21 females) captured (52 to 146 mm TL and 2 to 68 grams BW). The sex ratio of male and female is 5:1. In each sampling time there were fishes with 1st, 2nd, 3rd and 4th maturity level. The Gonado Somatic Index (GSI) is around 0.01-10.46 %. Fecundity is around 142-10,041 eggs. Relationship between fecundity and TL is weak ($R^2=0.01$), while the relationship between fecundity with BW is strong ($R^2=0.99$). The egg diameter is 0.98-1.00 mm. Histological study shown that the maturity stages of eggs in the ovary is various. In the 1st maturity level, the ovary consists of non vitellogenic eggs (diameter 0.05-0.18 mm). In the 2nd maturity stage, the ovary consists of non vitellogenic and early vitellogenic (0.15-0.44 mm). In the 3rd maturity level, vitellogenic eggs occur (0.28-1.95 mm) and in the 4th maturity level, most of egg in the ovary are mature (0.3-0.5mm), but there are non vitellogenic and early vitellogenic eggs. This evidence indicates that *B. hasselti* may be a “partial spawner” and it may spawn their eggs throughout the year.

Keyword : *B.hasselti*, *Belontidae*, sex ratio, GSI, maturity level and fecundity.

1. INTRODUCTION

Belontia hasselti or known as “ikan selinca” is small fish that commonly occur in irrigation canals in the palm tree plantation and also present in flood area around many rivers in Riau. This fish has economical value as it is a common aquarium fish and also used to be consumed by local people (Haryono, 2007).

Even though the *B. hasselti* can be easily found in Riau, its biological information is rare. The biological information available is limited to morphological characteristics and meristic of this fish (Kampai 2012) and gut content analysis (Azwar, 2012). The maximum size of *B. hasselti* captured in the Bakuok Lake, Kampar, Riau is 20 cm (TL) and 48 grams (BW). *B. hasselti* is an omnivorous fish that feed mainly on Chlorophyceae and Crustacean (Azwar, 2012). To understand the reproductive biology aspects of the *B. hasselti*, a study titled Reproductive Biological Aspect of *Belontia hasselti* in the irrigation canals of palm tree plantation in the Tambang Village, Kampar Regency, Riau Province has been conducted.

2. MATERIALS AND METHODS

This research was conducted for 3 months (February-April 2012) and fish samples were captured in 6 sampling points in the irrigation canals present in the palm tree plantation in the Tambang Village, Kampar Regency.

Fish was caught using bamboo fish trap (*pengilar*). The fish were studied in fresh condition or frozen. The fish gonad were processed for histological studied (fixed with formalin, alcohol series processes, HE stained, $\frac{1}{6}$ sliced). Parameters measured were sex ratio, Maturity Level (based on Cassey *in* Effendie, 2002), Gonadosomatic Indices (GSI), fecundity, egg diameter and histological structure of the gonad.

3. RESULTS AND DISCUSSION

In general, male and female fish can be characterized by secondary sexual characteristics. Both sexes are brownish green, covered by *ctenoid* scale, having rounded tail, compressed lateral body, spiny dorsal fin and relatively long ventral fin. Male has brighter color than that of the female (Figure 1).

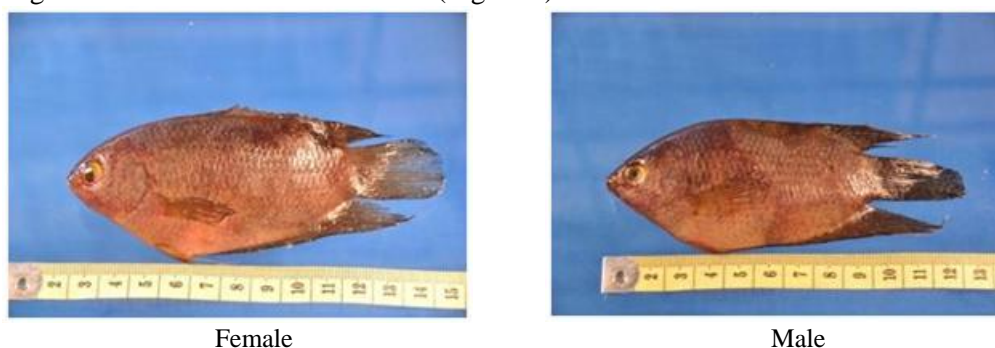


Figure 1. Female and male of *Belontia hasselti*

Total number of fish captures through out the research is 123 (102 males and 21 females). These fishes were on various maturity stages (Table 1). Mature females and males were present in February and March, while in April there was female in the 1st stage and males in the 1st and 2nd stages only.

The sex ratio of the fish was 5:1. This imbalance ratio between males and females may be related to weather and season during the research. The research was conducted from February to April which is coincidence with rainy season in Riau. During this season, water surface in the canals that commonly inhabit by the fish become higher (more than 2 meters depth). As the water surface higher, more food become available and the females gonad may develop into mature (Effendi 2002). Suroto *in* Ernawati *et al.*, (2009) also stated that spawning season of the tropical fishes is coincident with rainy season. However, there were few mature fish in the sampling area and there was no fish in the 5th maturity stage. Most of males captured during the study period was in the 1st and 2nd maturity stages. This fact indicates that the sampling area may not be the spawning area for *B. hasselti*. The mature fish may migrate and spawn in other areas. Sulastris (2009) also found that in the irrigation canal in the Tenayan area, most of *B. hasselti* found was males and she stated that the fish may migrate to rivers for spawning.

Table 1. The number of *B. hasselti* through out the study period, based on their maturity level

Months	Maturity Level									
	Female					Male				
	1 st	2 nd	3 rd	4 th	5 th	1 st	2 nd	3 rd	4 th	5 th
February	0	0	2	4	0	16	29	2	1	0
March	1	1	3	9	0	7	18	10	8	0
April	1	0	0	0	0	6	3	2	0	0

Anatomical and histological study of gonad shown that female and male gonads can be distinguished easily based on the gonad's morphological characteristics. Histological study, however, shown that development of gamets in ovary and testes are not synchronized. Sperms in all developmental stages present in the testes of fish in each maturity level (except the 1st stage), but the proportion/ volume of the mature sperms in the testes increases as the gonad developed. In the 4th maturity level, testes of male almost full with mature sperms. In female, the ovary size as well as the GSI is increase as maturity level improve. Egg granules can be seen in the 2th stage and reach maximum size in the 4th stage. The gonadal characteristics of fish of both sexes are presented in Table 2 below.

Table 2. Gonadal characteristics of *B. hasselti*

Maturity level	Female	Male
1	<ul style="list-style-type: none"> transparent, yellowish, smooth, eggs can not be seen clearly the ovary full of non vitellogenic eggs (0.05-0.18 mm in diameter) GSI 0.11%, 	<ul style="list-style-type: none"> transparent, whitish, smooth, small, threadlike form spermatogonia fill the lobus GSI 0.12%
2	<ul style="list-style-type: none"> light yellow, egg can be seen eggs diameter ranged from 0.15 to 0.44mm non vitellogenic and early vitellogenic eggs present GSI 1.45%, 	<ul style="list-style-type: none"> white, smooth, bigger than the testes in the 1st stage spermatocyte present GSI 0.41%
3	<ul style="list-style-type: none"> yellow, eggs can be seen clearly, but can not be separated eggs diameter ranged from 0.28 to 1.95mm non vitellogenic, early vitellogenic and few vitellogenic eggs present GSI 2.54% 	<ul style="list-style-type: none"> white, the edge of the testes is notched testes full with spermatocyte and mature sperms GSI 0.43%
4	<ul style="list-style-type: none"> orange, eggs can be separated easily ovary dominated by vitellogenic (mature eggs, 0.3-0.5mm in diameter), but there were few non vitellogenic and early vitellogenic eggs Fecundity ranged from 142 to 10,041 (average 4,390 eggs/ fish) GSI 5.37% 	<ul style="list-style-type: none"> milky white, bigger than the testes in the 3rd stage testes and ductus seminiferus fill with mature sperms GSI 0.83%

Female fecundity ranged from 142 to 10,041. The difference in the number of egg in each female may be affected by the size of the fish. Bigger fish produce bigger number of eggs, while small fish that just achieve the 1st maturity stage may produce small number of egg (Siby *et al.*, 2009). The relationship between body weight and fecundity is strong ($R^2=0.97$), but its relationship with TL is weak ($R^2=0.001$).

In each maturity stage, the GSI of male and female of the same size is different. Females have higher GSI than that of the males. It means that the gonad weight increment in female is faster than that of the male. This is a common phenomenon in fish, where the GSI of male is lower than that of the female (Rahardjo *et al.*, 2011). Fast increment of the ovary may cause by the accumulation of yolk in eggs, as the eggs become bigger, the ovary volume increase and the GSI also increase (Effendie, 2002). Morphological and histological structure of the *B. hasselti* gonad is presented in Figure 2.

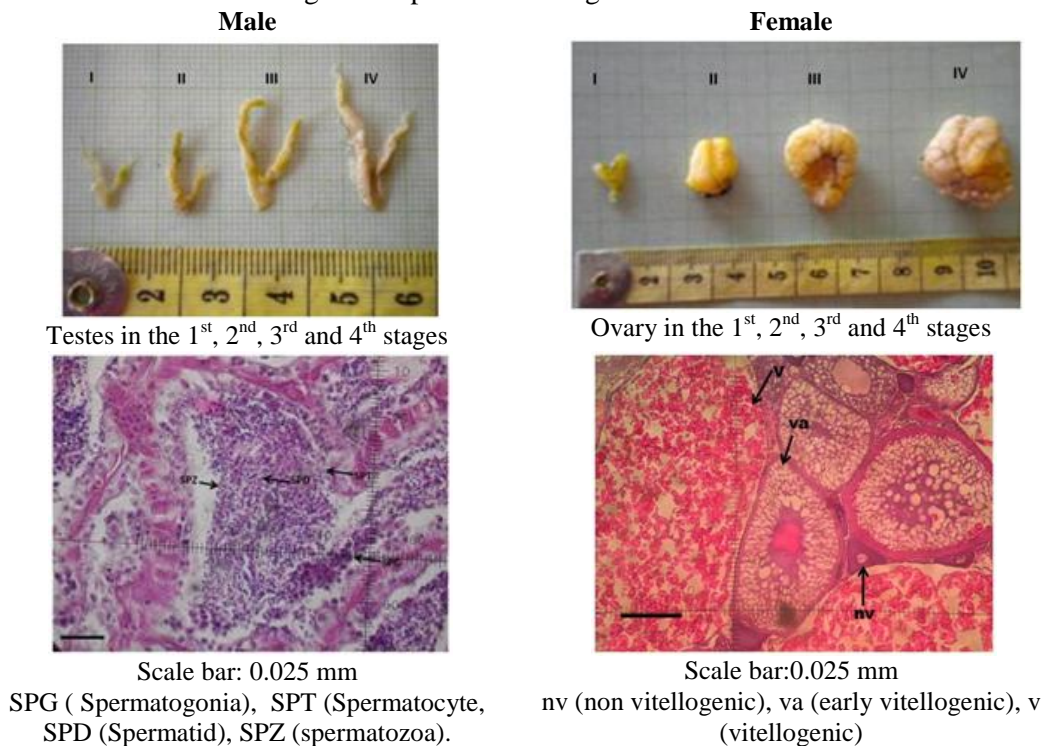


Figure 2. Morphological and histological structure of the *B. hasselti* gonad

As the mature fish present almost along the study period and gamets in all developmental stages present in testes and ovary of the *B. hasselti*, it is predicted this fish is “a partial spawner fish”. In each spawning season, only mature gamets are spawn. The remains/ immature gamets will be developed later and then spawned in the following spawning activity.

Conclusion:

- During the research, fish in several maturity stages were present, indicate the sampling time may coincidence with the spawning season of the *B. hasselti*.
- Fishes captured in the sampling area are mainly in the 1st and 2nd maturity stage, few mature fish and no fish in the 5th maturity stage. These facts indicate that the sampling area is not the spawning ground of that fish.
- Histological studies indicate that gamets in several developmental stages present in the testes and ovary of the fish and it indicates that *B. hasselti* is a partial spawner.

REFERENCES

- Azwar, D. 2012. Analisis isi lambung ikan selinca (*Belontia hasselti*) dari perairan Desa Terantang, Kabupaten Kampar, Provinsi Riau. Skripsi. Fakultas Perikanan dan Ilmu Kelautan Universitas Riau. Tidak diterbitkan
- Effendie, M.I. 2002. Biologi Perikanan. Yayasan Pustaka Nusatama. Bogor. Halaman 163.
- Ernawati, Y., Siti Nurul Aida, dan H. A. Juwaini. 2009. Biologi Reproduksi Ikan Sepatung (*Pristolepis grooti*) di Sungai Musi. Jurnal. Jurnal Iktiologi Indonesia, 9 (1):13-24, 2009.
- Kampai, A. 2012. Morfometrik dan meristik ikan selinca (*Polychanthus hasselti*) di Danau Bakuok Kecamatan tambang Kabupaten Kampar Provinsi Riau. Skripsi. Fakultas Perikanan dan Ilmu Kelautan Universitas Riau. Tidak diterbitkan.

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