

# The fecundity of fork-tailed threadfin bream (*Nemipterus furcosus*) in Bangka, Bangka Belitung

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**Abstract.** Fork-tailed threadfin bream (*Nemipterus furcosus*) is one of important economic fishes in Bangka. The sustainability of fork-tailed threadfin bream is threatened by degradation of natural habitat. Information of reproductive is needed for further management. The objective of this study was to examine fecundity of fork-tailed threadfin bream. The mean values of temperature was  $28.83 \pm 0.37^{\circ}\text{C}$ , respectively. Sex ratio during sampling showed that female fork-tailed threadfin bream greater than male population. Berried female fork-tailed threadfin bream found from March until November. The greatest number of berried female fork-tailed threadfin bream showed in July with berried female value of 25. Fork-tailed threadfin bream fecundity was 19951 and 66628, respectively. The fecundity data can be used to access the reproductive potential of fish stock and also as an assessment on stock size of their natural population.

## 1. Introduction

Fork-tailed threadfin breams (*Nemipterus furcosus*), are indigenous from Southern Japan to north-eastern Australia and the Indian Ocean. This species is a valued food source and has been fished commercially by hook and line. Fork-tailed threadfin breams are one of the important economic fishes in Bangka, Indonesia. The production volume of Fork-tailed threadfin breams was approximately 269.289 kg in 2010 and 293.618 kg in 2011 with the percentage of production at around 9.03 %. In 2012, catch increased to 311.502 kg or 6.09 %, while it reached a peak in 2013 at 434.774 kg (39.57 %) [1]. The catch may obtain high yields in a given year, but if fishing efforts continued it would decline in the years that followed. This is due to its resources been caught in the previous years. In line with the increase of production volume of the catch, there needs to be measure to manage and maintain the availability of Fork-tailed threadfin breams. However, studies about Fork-tailed threadfin bream fecundity and aspects of reproduction in Bangka is still lacking. Fecundity study is important in estimating the stock size of their natural population. Due to the importance of *Nemipterus furcosus* for commercial fisheries, much is known about their ecology, reproductive biology and behavior. The objective of this study was to provide information on the reproductive biology including sex ratio, fecundity, spawning season, and fishing ground of *Nemipterus furcosus* in Bangka.

## 2. Methodology



A total of 456 specimens were randomly collected each month from January until December 2015 at Nusantara Fishery Port, Sungailiat, Bangka [2]. *Nemipterus furcosus* was caught using handline fishing with the fishing ground located on the north-eastern parts of Bangka Island. Total length (TL) was measured to the nearest 0.1 mm. Ovaries were macroscopically examined to determine the condition of maturity. Each ovary was divided into 3 portions (anterior, middle and posterior) and one third was taken to estimate fecundity. Fecundity was analyzed using Efendie [3]. In total, 108 ovaries were used to estimate fecundity. The relationship of fecundity (F) compared to body weight (BW) was described by the allometric equation  $\ln F = b \ln BW + a$ , while the relation of fecundity (F) compared to total length (TL) was described by the allometric equation  $\ln F = b \ln TL + a$ .

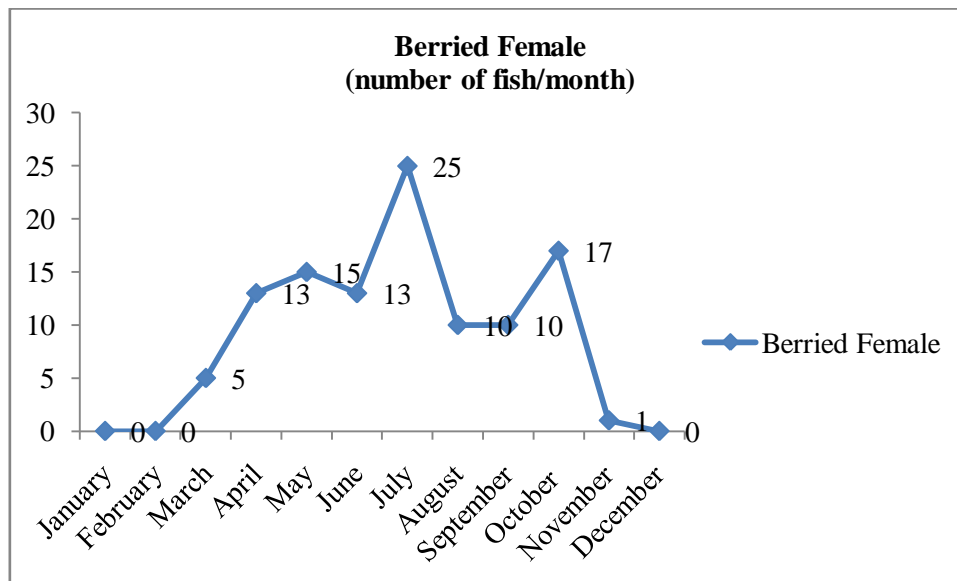
### 3. Result and Discussion

#### 3.1. Sex Ratio

Overall, sampling revealed that the sex ratio of Fork-tailed threadfin brems were 263 female, 193 male and 108 berried female. The sex ratio showed that during 2015 the number of female *Nemipterus furcosus* was significantly greater than the male population, with a ratio of Female: Male = 1.4: 1. This ratio is not harmful to fish stocks. Females outnumbered males throughout the year except in January and March. The proportion of Female: Male in January and March were 1: 1.2; 1:1.7, respectively. Meanwhile in May, the ratio between female and male remained equal at 1:1. Furthermore, the highest gap in the number between female and male of the fish was found in July with the sex ratio of 6:1. Comparisons between both sexes of female and male consecutively from June until December, show that the number of females was greater than males. The sex ratio for female fish ranged from the lowest of 1 in January, March and May to the highest of 6 in July; whilst the proportion for males reached the highest at 1.7 in March.

#### 3.2. Fecundity

The monthly mean length and weight of berried Fork-tailed threadfin brems ranged between  $19.10 \pm 0.71$  cm –  $22.12 \pm 2.50$  cm and  $76.04 \pm 18.39$  gr –  $114 \pm 14.26$  gr. Fecundity (F) compared to total length (TL) was  $\ln F = 5.4275 \ln TL - 5.7945$ . Fecundity (F) compared to body weight (BW) was  $\ln F = 2.0188 \ln BW + 1.3817$ . The development of the five stages of maturity for Fork-tailed threadfin brems gonad was determined by visual examination. Stage I: testes and ovaries are flat transparent. Stage II: testes are white flat and ovaries are white tubular with blood vessels surrounding the gonad. Stage III: testes are white tubular with  $2/3 - 3/4$  body cavity in length; ovaries are light yellow tubular. Stage IV: testes are white tubular, fulfilling the body cavity and ovaries are yellow; eggs can be seen by visual examination. Stage V: gonads are red creased. Eggs will release if female fish are in stage IV of maturity gonad.

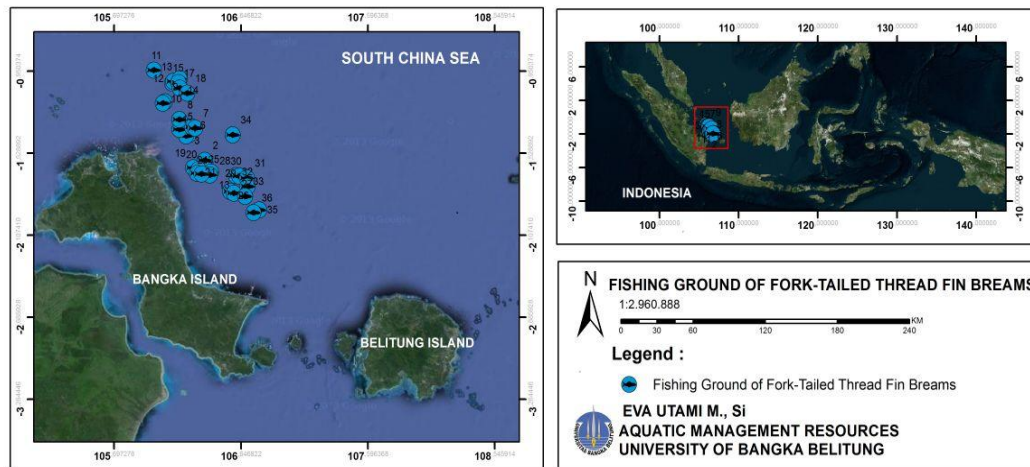


**Figure 1.** Monthly number of berried female Fork-tailed threadfin bream (number of fish/month).

The amount of berried female Fork-tailed threadfin bream each month during 2015 fluctuated considerably. The greatest number of berried female Fork-tailed threadfin bream occurred in July with 25 berried female fish. Beginning in January and February, none of the female ovaries were indicated to be in the mature stage. Nevertheless, there was a gradual rise of the amount of berried females in March, April and May, at 5, 13 and 15 fish, respectively, followed by a marginal dip until 13 berried female fish was caught in June. After reaching a peak of approximately 25 fish in July, it decreased sharply to a mere 10 fish. The amount of berried females remained the same for the following month, while, it increased negligibly in October to roughly 17 fish. It dropped sharply to only 1 berried female in November and leveled off thereafter. The macroscopic appearance of ovaries indicated that most immature ovaries were presented from November – March. Spawning season appeared from April until October with a peak in July. The protection of adults during spawning season is needed to ensure the sustainability of fish stock [4].

### 3.3. Fishing Ground

The fishing ground of the Fork-tailed threadfin bream is in the north-eastern part of Bangka Island with the range of coordinates between 105°50'-106°50'E; 0°50'-2°1'S. In Bangka Belitung Province, Fork-tailed threadfin bream are caught by handline. Handline is a fishing technique where a single fishing line is held in the hands with one or more hooks and fishing lures attached to the line.



**Figure 2.** Map showing the fishing ground of Fork-tailed threadfin bream.

Fork-tailed threadfin bream are demersal fish. It is found in 15 meters to 40 meters under the sea surface with a sandy seabed and coral reefs. The temperature of sea water was measured between 27°C at the lowest to 31°C for the highest. The average temperature of the Bangka sea water during the year 2015 was  $28.8 \pm 0.39$  °C.

#### 4. Conclusions:

The fecundity of Fork-tailed threadfin bream in Bangka appeared from April until October, with a peak in July. The sex ratio showed that the female *Nemipterus furcosus* population was significantly greater than its male population, with a ratio of Female: Male = 1.4 : 1. The fishing ground of Fork-tailed threadfin bream is in the north-eastern part of Bangka Island.

#### 5. References

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