



**Establishment and Operation of a Regional System of Fisheries Refugia in the
South China Sea and the Gulf of Thailand**

REPORT

BIOLOGICAL ASPECT OF SQUID (*Urotheutis chinensis*) IN BANGKA

**SOUTHEAST ASIAN FISHERIES DEVELOPMENT CENTER
TRAINING DEPARTMENT**

BIOLOGICAL ASPECT OF SQUID (*Urotheutis chinensis*) IN BANGKA

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1. Background

The Squid *Urotheutis (Photololigo) chinensis* is one of the commodities from capture fisheries in the Province of Bangka Belitung Islands. The sea of Bangka Belitung is a fishing ground of squids not only for local fishermen but also from outside Bangka Belitung, like, Banten, Lampung, and West Java. This indicates that the sea of Bangka Belitung provides a potential area for the squid fishery.

According to fisheries statistics, the number of gears operated for catching the squids tend to increase in the last five years. In addition, there is a trend of catching squid during their critical life cycle that may harm to their recruitment. Therefore, management measures with the fisheries refugia approach were introduced to prevent depletion stock.

Understanding the biological aspects of squids is one of the keys to fisheries management. The biological data of the squid were used to get essential approach in managing their resources. This report focuses on the length distribution, length at first capture and length at maturity of the squid in Bangka.

2. Method

Data Analysis

The length-weight relationship was analyzed using the following equation (Effendi, 1979; Nielsen & Johnson, 1985; Effendi, 1997):

$$W = aL^b$$

dimana:

- W = weight (gram)
- L = mantle length of squid (mm)
- a = intercept
- b = slope

Estimation of the average mantle length of squid when 50% of the population is gonads mature (L_m) used the logistic curve method (King, 2007) with the following equation:

$$P = 1/(1+\exp[-a(L-L_m)])$$

- P = probability of the mean size of gonadal mature shrimp
- a = slope constant
- L = mantle length of squid
- L_m = the length of the mantle at the population average.

Estimation of the average mantle length of squid at the first caught (L_c) used the logistic curve method (Sparre & Venema, 1992) with the following equation:

$$S_L = 1/(1+\exp[a-b*L])$$

- S_L = probability of the average size of the squid being caught
- a dan b = the constants
- L = mantle length of squid

Result and Discussion

Length Distribution

The squids, *Urotheutis (Photololigo) chinensis*, were collected in November using Squid Jigging, Lift Net, and Floating Lift Net from four locations in Bangka Regency (Koba, Rebo, Bedukang, and Tuing). There are 765 squids with various mantle lengths, from 5.0 – 34.0 sm (average 13.7 ± 4.9

cm) and the weight about 6.21-342.63 gram (rata-rata 79.01 ± 53.62 gram). The range of male and female *U.(P.) chinensis* measured in this study is presented in Table 1

The mantle length mode (ML) of male *U.(P.) chinensis* was at a median size of 11.0 cm and 31.0 cm, while the female *U.(P.) chinensis* was at a median size of 17.0 cm (Figure 1). The mantle length of *U.(P.) chinensis* is quite variable in some waters, such as in the Andaman Sea, Thailand, ML 42 to 186 mm (Sukramongkol et al. 2006), Beibu Bay, China, ML 49-438 mm and weighing 7.3 -723 grams (Yunrong et al. , 2013), Banyuasin coastal waters, ML 40-120 mm and the weight ranges from 2-42 grams (Fauziyah et al., 2020). In Rebo waters, Bangka, a male of *U.(P.) chinensis*, size ranging from 84-370 mm ML with a weight ranging from 9-349 grams, a female ML ranging from 78-252 mm with a weight range of 14-277 grams (Oktariza et al., 2015).

Table 1 Range of Mantle length and weight of the Squid, *U.(P.) chinensis* in Bangka

Sex	Squids (ind)	Mantle Length (cm)	Weight (gram)
Male	498	5.0-34.0 (13.4 ± 5.5)	6.21-342.63 (72.80 ± 56.89)
Female	267	5.0-25.6 (14.2 ± 3.5)	7.27-234.4 (90.59 ± 44.77)

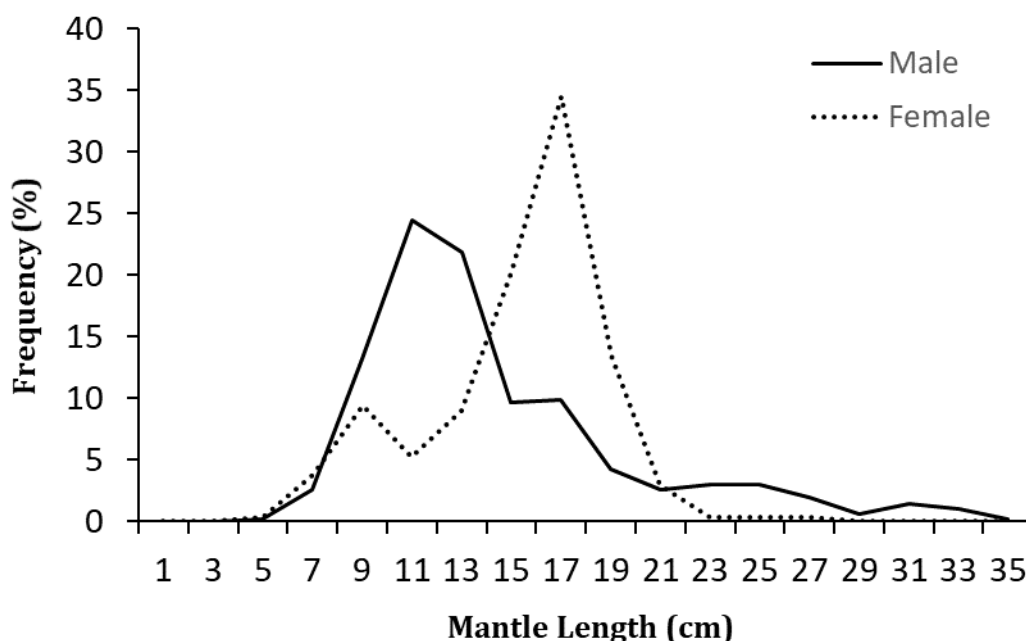


Figure 1. Length distribution of male and female *U.(P.) chinensis*

Length-weight relationship

The Length-weight relationship of the male *U.(P.) chinensis* from Bangka $W = 0.4595ML^{1.9044}$ and the female is $W = 0.1675ML^{2.3340}$

The relationship between mantle length and body weight of male and female *U.(P.) chinensis* is negative allometric ($P < 0.05$), where based on the b value, the male *U.(P.) chinensis* body tends to be flatter than the female because it has a small b value. (Figure 2). This reflects that the length of the squid's mantle grows faster than its weight.

The value of b from this study is greater than other studies like in Lamongan Waters (Mulyono et al., 2017) and Banyuasin Coastal Waters (Fauziyah et al., 2020). The b value of the length-weight relationship of male squid in this study is similar to the b value from another study in Rebo Waters, Bangka (Oktariza et al., 2015). In addition, the b value of the length-weight relationship of female

squid in this study is smaller than other studies conducted in Rebo Waters, Bangka ($b=2,315$) and much larger than Lamongan Waters, with $b = 1.63184$ (Mulyono et al., 2017).

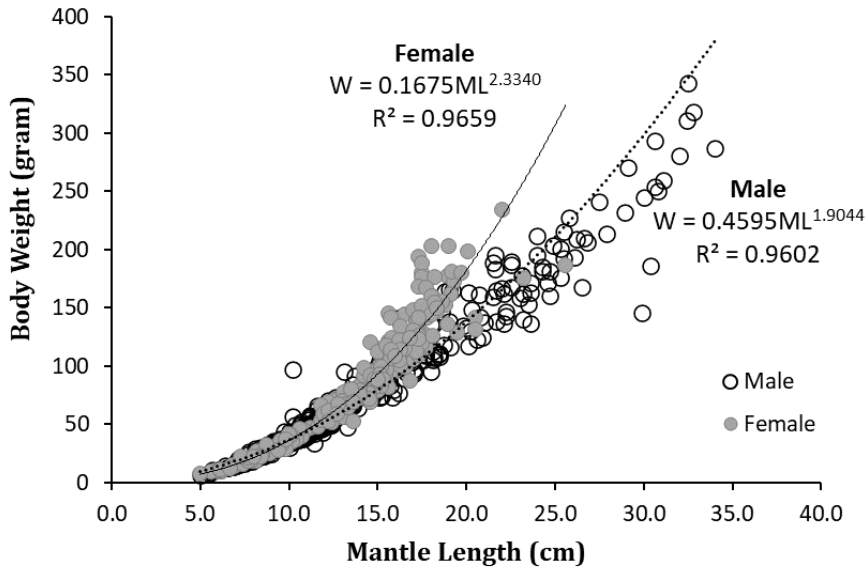


Figure 2. Length weight relationship of *U.(P.) chinensis* from Bangka water

The Length at First Capture (Lc) and Length at Maturity

Based on the logistic curve, *U.(P.) chinensis* caught in Bangka waters had an average size of first caught (L_{c50}) of 12.4 cm for males and 13.9 cm for females (Figure 3). The average length of *U.(P.) chinensis* when 50% of the population reached gonad maturity (L_{m50}) was 18.8 cm for males and 15.1 cm for female

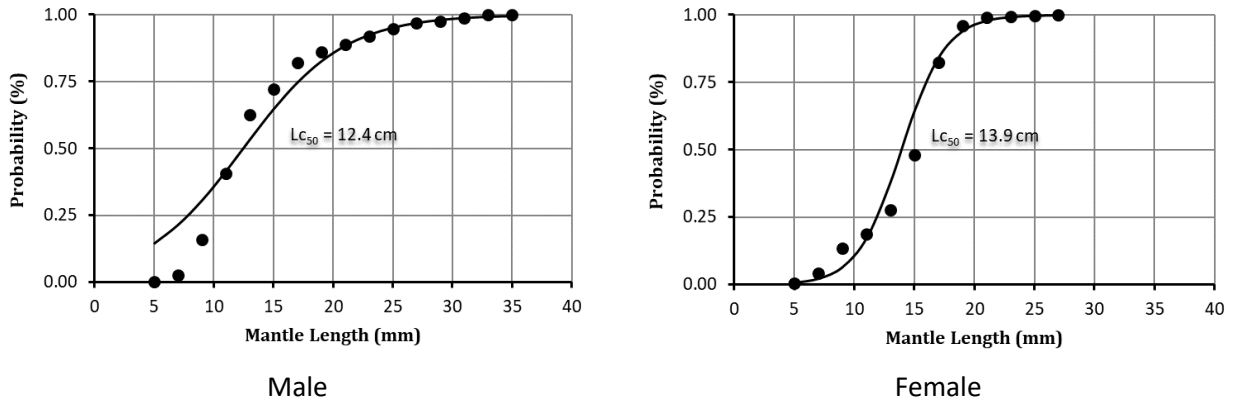


Figure 3. Length at first capture (L_{c50}) of male and female *Uroteuthis chinensis*

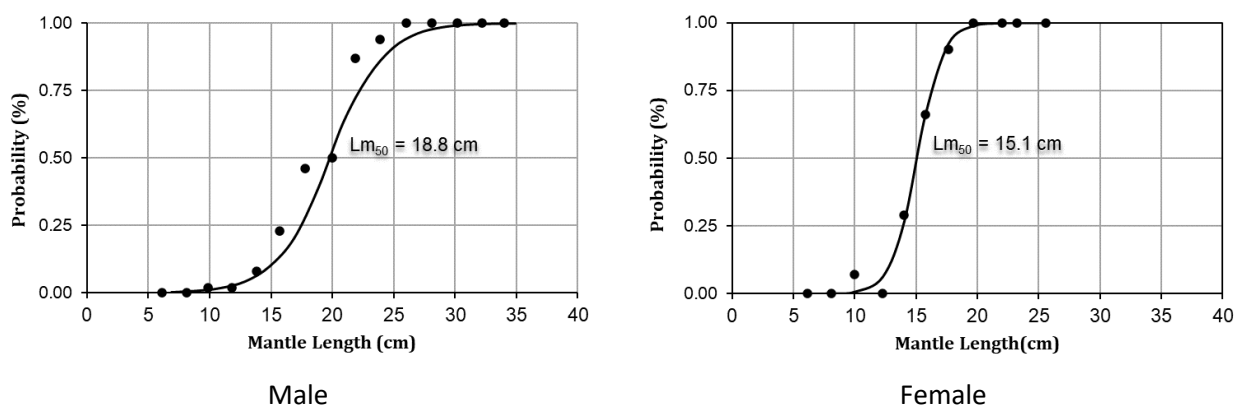


Figure 4. Length at first mature (L_{m50}) of male and female *Uroteuthis chinensis*

The length at first capture of *U.(P.) chinensis* in this study is larger than L_c of species caught in other locations such as in Lamongan Waters, $L_c=9.4$ cm and Banyuasin which was $L_{c50}=10.3$ cm (Mulyono et al., 2017; Fauziyah et al., 2020). In addition, the length maturity of the species in this study was larger than from another study. Fauziyah et al., 2020, found that the L_m of the species in Banyuasin Coastal Water was $L_{c50}=147$ mm. Chotiyaputta (1990) found that *U.(P.) chinensis* first matured at a size of 10.5 cm for males and 10.0 cm for females in the Western Gulf of Thailand.

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