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Cuttlefish (*Sepia Spp*) Identification and Biological Analysis of a Dominant Cuttlefish Species Landed in Muncar, Banyuwangi Regency, East Java.

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ABSTRACT

Identification and biological analysis of Cuttlefish (*Sepia spp*) this could be the basis of information for cuttlefish resource management for sustainability. The aims of this study were to determine the species composition of cuttlefish, determine similarity in morphology among cuttlefish species, and length-weight relationship of dominant species cuttlefish landed in Muncar, Banyuwangi, East Java. The analytical method used is species composition analyze, Hierarchical clustering analysis to determine similarity among cuttlefish species and length-weight relationship analysis of dominant cuttlefish species with the following equation $W = aL^b$. There are three species of cuttlefish were landed in Muncar, Banyuwangi, *Sepia pharaonis* with 373 individuals (92.6%), *Sepia latimanus* 19 individuals (4.7%), and *Sepia esculenta* 11 individuals (2.7%). The results of length-weight relationship analysis cuttlefish dominant species, *Sepia pharaonis*, the b values obtained in the total sample, males and females respectively are 2.55, 2.56, and 2.57. It shows that the growth properties of *S. pharaonis* is negative allometric. It means the population has thin body shape where the increase in length faster than weight gain.

Keywords: Cuttlefish, Identification, Length Weight Reliationship, Muncar, Bali Strait

INTRODUCTION

One of the potential demersal fishery that is derived in the Bali Strait from a class cephalophoda namely cuttlefish, squid and octopus. Cuttlefish itself is one export commodities many foreign exchanges contributed to Indonesia. Data from statistics (2012) in 2012 volume of exports to squid and cuttlefish reached 58.145.503 kg amounting to us $ 93,818,852 (if the exchange rate of rupiah US $1 = IDR 13,000 in 2012).

According to the statistics fisheries by the directorate general fisheries catch (2015), in 2014 the catch cuttlefish reached 17.930 tons. That figure has contributed 10.2% of the total catch cephalophoda class in 2014. While the catch the in the same year a month 150.623 tons, and the catch octopus of 6.838 tons.

Until now the fishery resources cuttlefish is only obtained from nature namely the catch fishermen because it is very difficult to cultivate, and feared those resources will continue to decline in terms of quantity or quality. So that the required preventive measures for resource management cuttlefish so that those resources fixed to save. Calamari identification species as well as the biological study of cuttlefish on the length - weight relationship is one of the conservation efforts that could be done to make fixed lestari resources.

Purpose

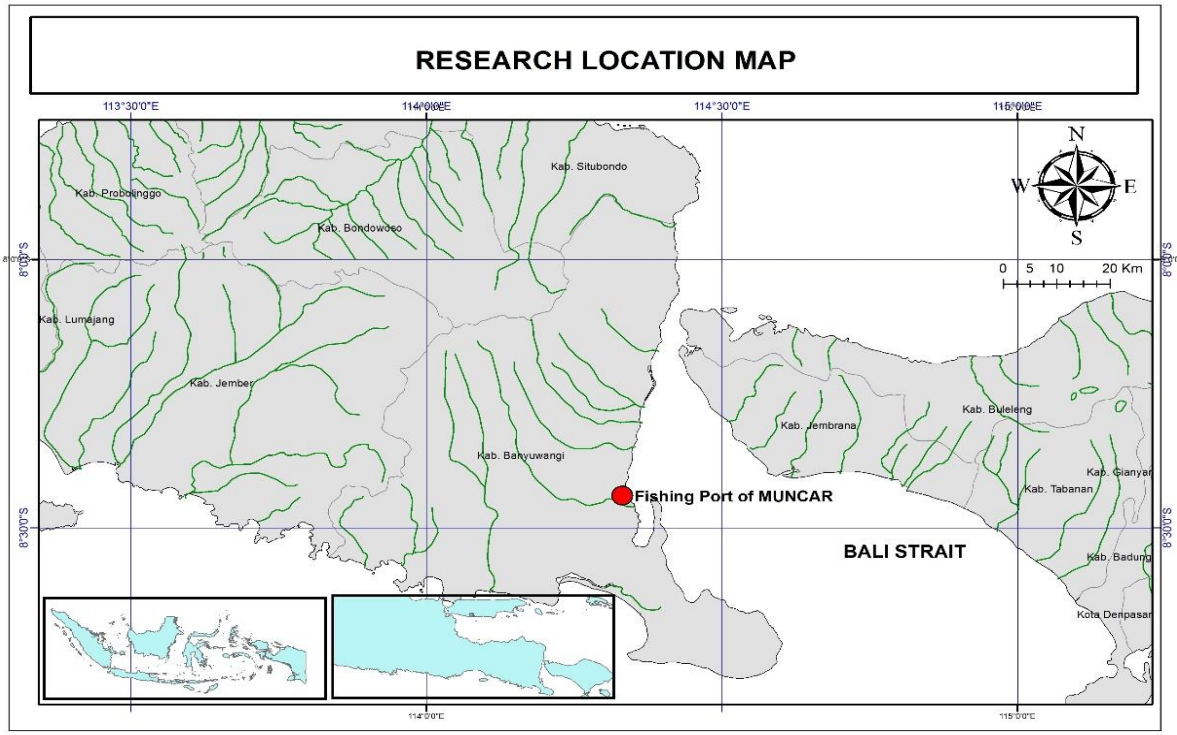
The purposes of this research are to find composition species cuttlefish which was put ashore on Muncar Banyuwangi, knowing all the species cuttlefish between which was put ashore based on morphology characteristic, and it knows a long-heavy cuttlefish dominant was put ashore on Muncar Banyuwangi, East Java.

METHODS

Date and Place of Research

Research carried out on the date April 21 until May 20, 2016 which is housed in large agent of cuttlefish namely UD Usaha Jaya in UPT PP (*Fishing Base*) Muncar district, Banyuwangi, East Java. The place of UPT PP Muncar shows in Appendix 1.

Appendix 1. Research Map



Collecting Data (*Sampling*)

The data used in research consisting of primary and secondary data. Primary data gathered the numbers, length of coat (cm) and weight of cuttlefish (gr) were put ashore on large agent UD Usaha Jaya - UPT PP Muncar, and interviewed to fishermen and cuttlefish agent. Meanwhile secondary data obtained from the scientific journal of this research and cuttlefish production data for 1 year in 2015-2016 from Bali Strait Water catchment in Muncar fishing base.

Analysis Data

1. Composition Genus Analysis

This analysis used to locate calamari composition species that ashore by fishermen on Muncar, Banyuwangi district. Composition species calculation done according to formula based on Sparre and Venema (1999):

$KJ = Ni/N \times 100\%$ …….. (1)

Where:

KJ = Composition of Genus (%)
Ni = Individu amount in each species
N = Individu amount in all species

Measurement of value length first caught (length at first capture/Lc) searchable using data frequency length that is the results of the frequency of the middle value of each individual class. According to Sparre and Venema, (1999), to calculate measurement of value length first caught using formulas as follows:

$$Fc\ (x) = \frac{n.dL}{S\sqrt{2\pi}}\ \mathrm{x}\ e^{-\left(\frac{L-L'}{2S^2}\right)} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ (2)$$

$$\Delta \ln Fc\ (x) = a - b\ \mathrm{x}\ (L + \tfrac{\Delta L}{2}) \quad \ldots\ldots\ldots\ldots\ (3)$$

Where ,
Δ ln Fc (x) = Difference between leght class in ln
(L + (ΔL/2)) = Barrier from each class
a, b = constanta

This analysis was used for knowing the length of cuttlesh head in every cacted by fisherman, so the result from measurement it can be used to know the decreasing from cuttlefish population.

2. Length – Weight Relationship

According to Sparre and Venema (1999), to know amount of length – weight relationship of cuttlefish can use the fuction:

$$W\ (i) = a\ .\ L\ (i)^b \quad \ldots\ldots\ldots\ldots\ldots\ldots\ (4)$$

Where,
W = Weight of fish body -i (gram)
L = Length of fish body -i (cm)
a and b = Constanta

According to Prihatiningsih *et al.,* (2013), to test the b = 3 or b & it; 3 undergone t-test (the partial), that needs to be done hypothesis on the b assuming:
H_0: b = 3, a long with wight is isometric
H_1: b < 3, a long with wight is allometrik namely: links between length-weight relationship is allometrik positive, if b > 3 (extra weight faster than extra long), and allometrik negative, if b < 3 which means long rising faster than extra weight.

RESULT AND DISCUSSION

Effort of Cuttlefish Catchment

Based on interview to fishermen in Muncar, Banyuwangi, cuttlefish or the box (*Sepia spp*) is the target of the catch fishing. All cuttlefish which were put ashore is the result of the catch fishing. A catch of squid jigging itself is a modification of a catch hand line still traditional. Same as hand line, squid jigging still use attractor as *pemikan* to catch squid or cuttlefish (Sudirman, 2013). To draw the made up of several parts the fishing lines, rolling fishing lines, swivels, the bait, the barbs hooked, and sinker.

In an equipment get a fishing line cephalopods one a scroll is having long fishing lines more or less 100 fathoms (1 fathoms = ±1.5 m) with the monofilament, the fishing lines rolled at a wood or bamboo. There is 3-2 artificial bait on each roll. Artificial bait it consists of the agency made of plastic brightly colored with the length of about 10-16 centimeters and furnished with 2 a circle of hooks (ring of hooks) that each amount twelve hooks.

Based on the time of fishing that line cephalopods which catch cuttlefish on operating day starting from 9 am until 12 am, while for fishing rods cephalopods which catching sweet cephalopods or binocular cephalopods operate at night by means of a help lights. In one trip, fishermen need 2-4 time day in the sea, depending on the number of their catch.

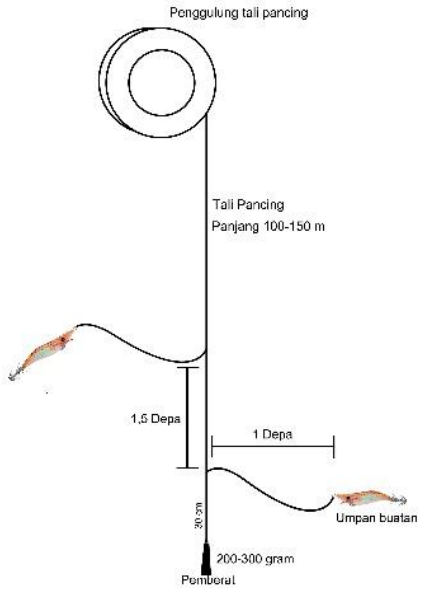


Figure 1. Squid Hook Construction that used by Fisherman in Muncar, Banyuwangi.

Cuttlefish (*Sepia pharaonis*) Description that Landed by Muncar Fisherman

Based on data at the time, the research conducted is UD Usaha Jaya as large agent cuttlefish in Muncar, Banyuwangi, there are 3 species cuttlefish which were put ashore by Muncar Fisherman, namely *Sepia pharaonis* with local name the zebra, *Sepia latimanus* or the coral, and *Sepia esculenta* or the sand. But, the dominant catch from Bali Street is *Sepia pharaonis*.

Figure 2. *Sepia pharaonis*

Cephalopods zebra or sepia pharaonis is a large species cuttlefish many caught by Muncar fisherman. These species have features with pattern a coat resembling pattern on the body zebra. The long coat cuttlefish could reached 420 mm and maximum weight in amount 5 kg.

Production Data of Cuttlefish by Muncar Fisherman

Data production cuttlefish it was a result of recapitulation of the purchase cuttlefish by greater agent than small agent and fishermen. Data production cuttlefish the highest is in August where there are 14.259 kg cuttlefish and the average per day of one kg. Data on production cuttlefish the lowest happened on the January in amount 57.5 kg cuttlefish with the average per day 1.9 kg.

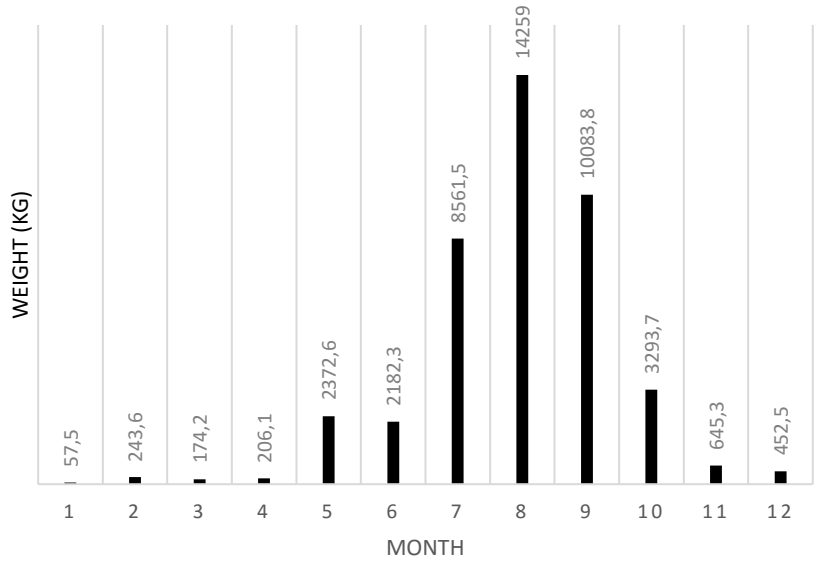


Figure 3. *Sepia spp* Production in 2015

Species Composition Data of Cuttlefish in around Reasearh Time

Total cuttlefish were put ashore by Muncar fisherman during the survey amount 403 tails. Cuttlefish (*Sepia pharaonis*) is the most was put ashore in the research by a number of individuals about 373 tails (92.60 %), as for *Sepia latimanus* about 19 tails (4.70 %) and *Sepia esculenta* about 11 tails (2.70 %).

Table 1. Species Composition of Cuttlefish

Local Name	Latin Name	Amount	Persentase
Cumi Zebra	*Sepia pharaonis*	373	92.6%
Cumi Karang	*Sepia latimanus*	19	4.7%
Cumi Pasir	*Sepia esculenta*	11	2.7%
TOTAL		403	100%

During the survey, in every day not there is always cuttlefish is in large agent (UD Usaha Jaya), obtained average daily cuttlefish ashore with trusted to be the most large namely *Cumi Zebra* (*Sepia pharaonis*) with average daily 13 tails per day, then *Cumi Karang* (*Sepia latimanus*) and *Cumi Pasir* (*Sepia esculenta*) that on average routine daily 1 tail per day.

Distribution Length of Dominant Cuttlefish Coat

Sepia pharaonis is a large species dominant cuttlefish caught by Muncar fisherman during the research period. The results to scatter frequency the long coat sepia pharaonis shows that in the period research have a range the length of coat starting from 14 cm-36 cm and was dominated by class size 20.9-23.2 cm.

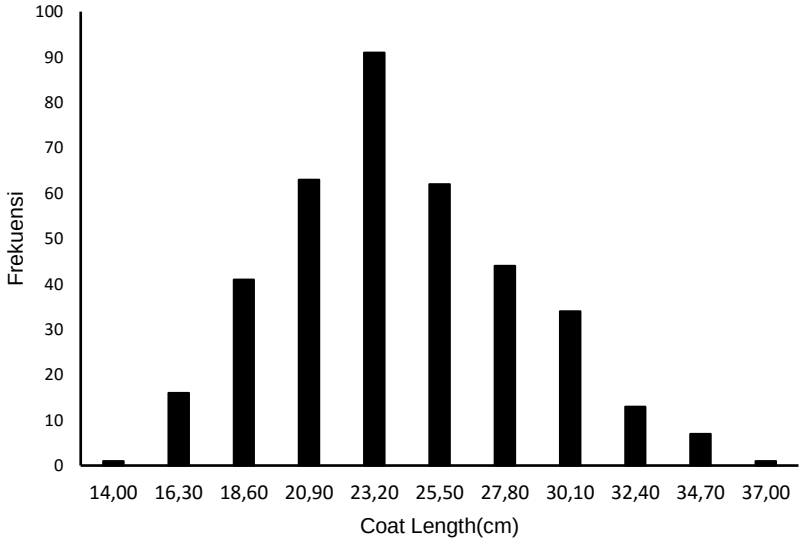


Figure 4. Coat Length of *Sepia pharaonis* Frequency in Period

Length at First Capture (Lc)

From our analysis long first caught using data to scatter the long coat cuttlefish dominant during the period research or value Lc (length at first capture) of Cuttlefish (*Sepia pharaonis*) in Bali Strait water arrested use a fishing line squid with value 26.6 cm.

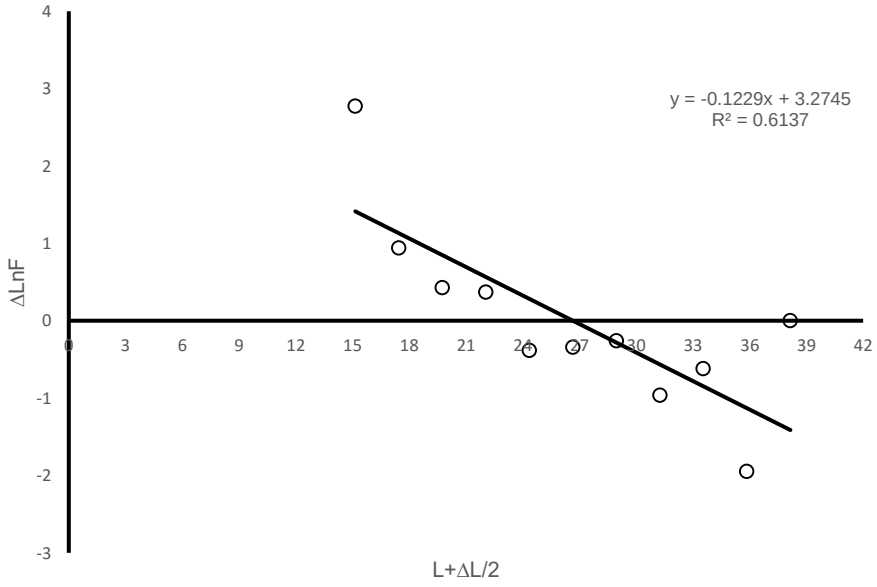


Figure 5. Graphic of Lc Cuttlefish

Length – Weight Relationship

From the data composition in table 1, obtained dominant species of cuttlefish namely the zebra species (*Sepia pharaonis*) amount 373 tails. The male cuttlefish amount 183 tails and the number of female cuttlefish about 190 tails. Following the analysis of Length-Weight relations from *Cumi Zebra* (*Sepia pharaonis*) can be seen in table 2.

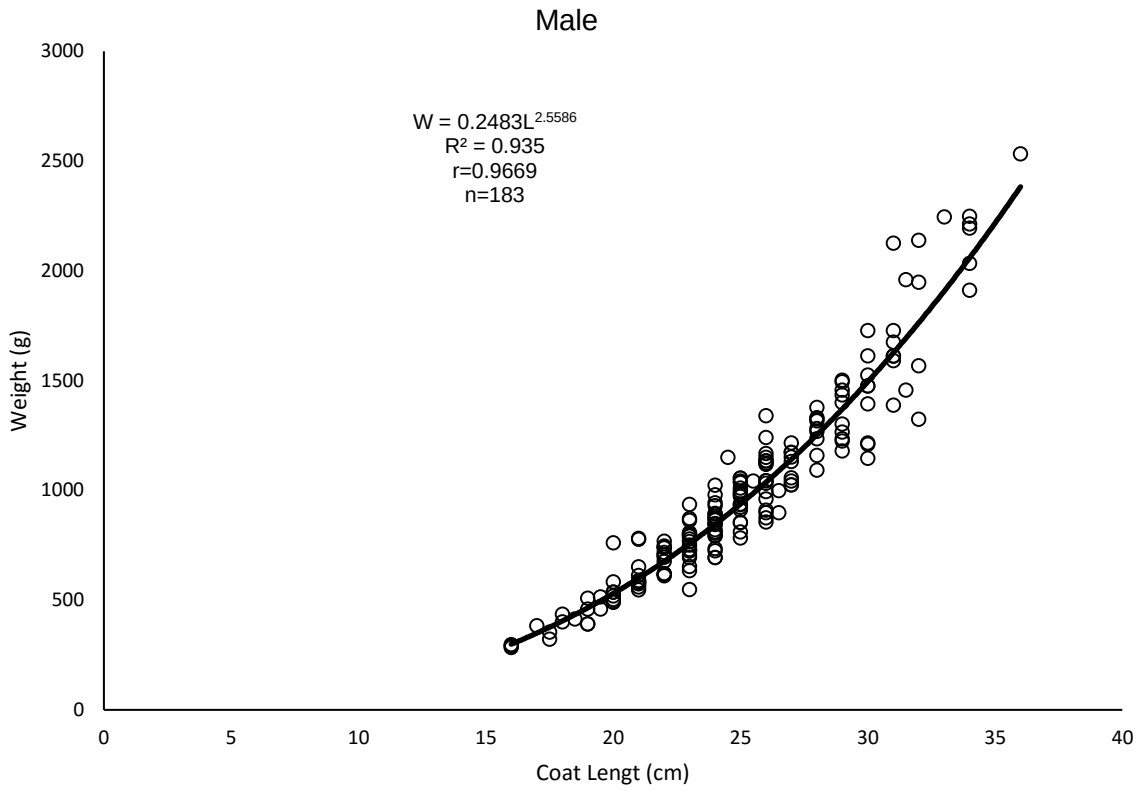
Table 2. The Analysis Result of Length-Weight Relationship.

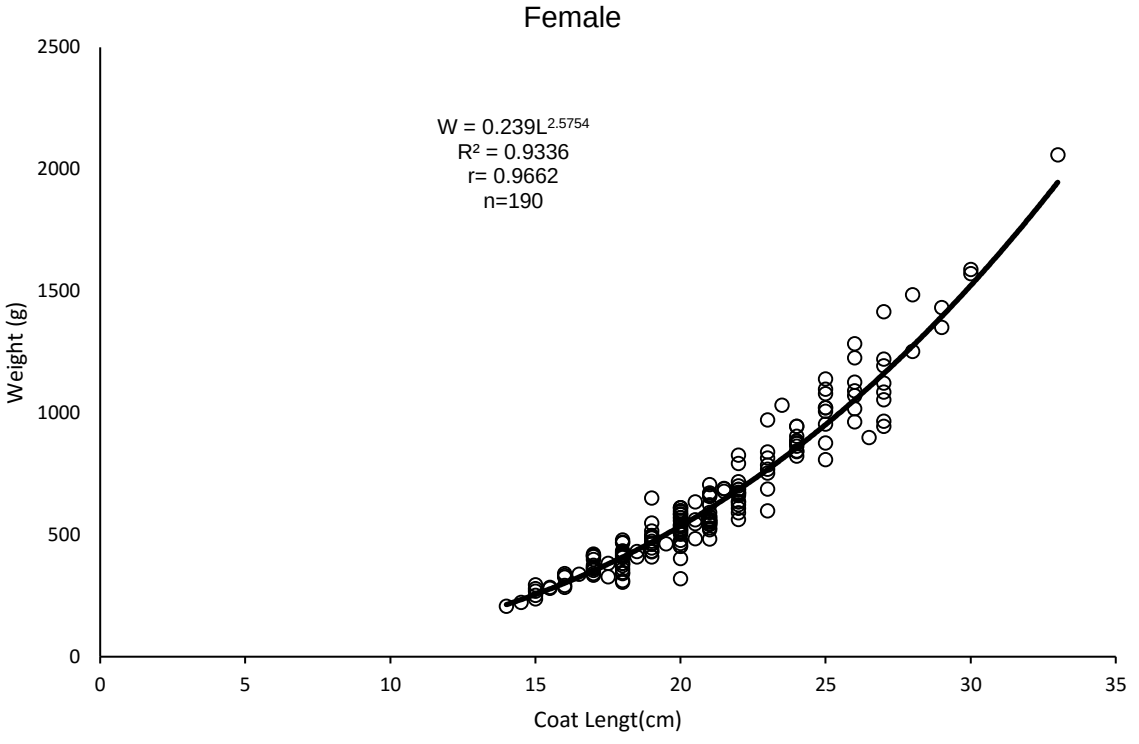
Parameter	Sample Total	Male	Female
Sample Total (tail)	373	183	190
Coat Length Average (cm)	23	25	21
Weight Average (gr)	817.3	997	644
Log a	-1.3569	-1.3930	-1.4312
a	0.2574	0.2483	0.2390
regression coefficient (b)	2.5491	2.5586	2.5753
correlation coefficient (r)	0.9735	0.9669	0.9662
Regresion Fuction	$W=0.2574L^{2.5491}$	$W=0.2483L^{2.5586}$	$W=0.2390L^{2.5753}$
Growth Type	Alometric negative	Alometric negative	Alometric negative

Table 2 showing if length average and weight average of male body is bigger that female body. B value from male cuttlefish is 2.56 and female cuttlefish is 2.58. Meanwhile b value from all cuttlefish is amount 2.55. These results show this cuttlefish has growing type with allometric negative, because the b value from regression is less that 3, including male, female, and both combination. Comparing the final result about length-weight relationship of cuttlefish with other research is the same species (Table 3). The weight-length relationship graphic shows in figure 6.

Table 3. Length-Weight Relationship Based on Another Research

No	Location	Similarities of Length Weight	DML Range	N	References
1	Karnataka, SW India	♂: W=0.3306L2.5389 ♀: W=0.3254L2.6057	5.5-37 cm 5.1-35 cm	453 457	Sasikumar *et al*. (2012)
2	Vizhinjam, South India	♂: W=0.00098L2.5058 ♀: W=0.00072L2.5478	13-33 cm 15-32 cm		Silas *et al*. (1985)
3	Coast of Oman, Arabian Sea	♂: W=0.2402L2.6714 ♀: W=0.2256L2.6953	5-44 cm 4-41 cm	1895 2051	Mehanna *et al.* (2014)
4	Gulf of Carpentaria, Australia	♂: W=0.00015L2.89 ♀: W=0.00029L2.76	3.4-17.3 cm 2.8-19.2 cm	327 (M+F)	Dunning *et al*. (1994)
5	**Selat Bali, Muncar**	**♂: $W=0.2483L^{2.5586}$** **♀: $W=0.2390L^{2.5753}$** **♂♀: $W=0.2574L^{2.5491}$**	**14-33 cm** **16-36 cm** **14-36 cm**	**183** **190** **373**	**This research**


Male
W = 0.2483L2.5586
R² = 0.935
r=0.9669
n=183
Weight (g)
Coat Lengt (cm)
0
500
1000
1500
2000
2500
3000
0
5
10
15
20
25
30
35
40


Female
W = 0.239L2.5754
R² = 0.9336
r= 0.9662
n=190
Weight (g)
Coat Lengt(cm)
0
500
1000
1500
2000
2500
0
5
10
15
20
25
30
35

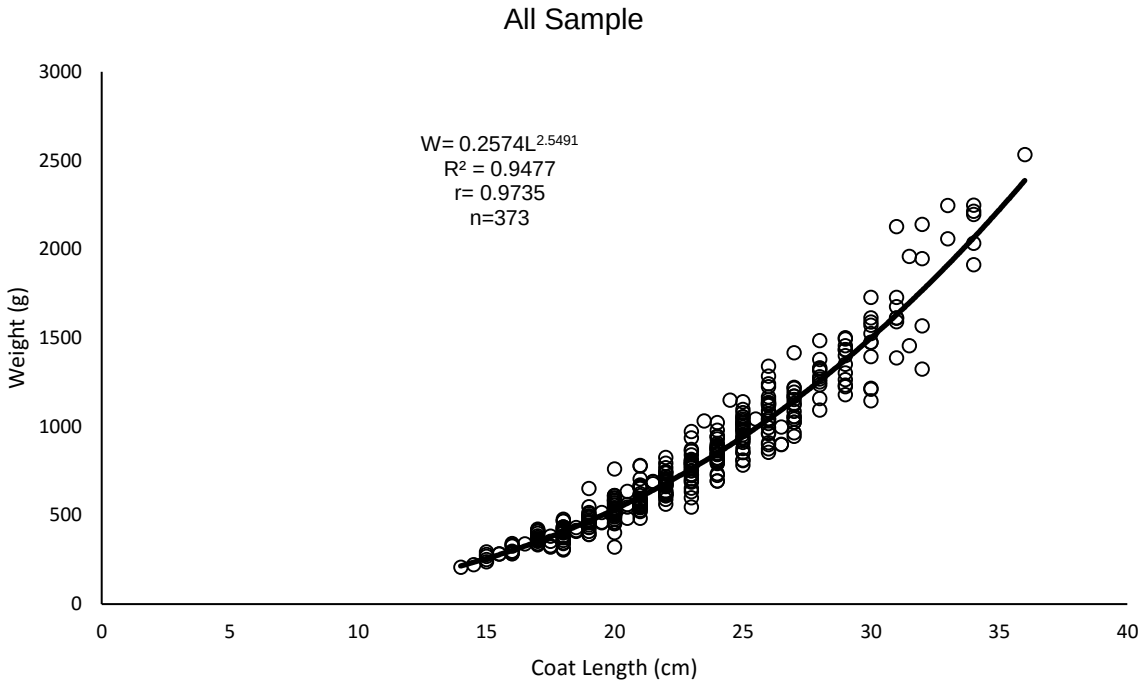


Figure 6. Length-Weight Relationship of *Sepia pharaonis* on Male, Female, and All Sample That Landed in Muncar.

Cuttlefish he was put ashore by Muncar fisherman having worth a correlation coefficient (r) of 0.9669, the cuttlefish of 0.9662 while combination male and female having worth a correlation coefficient (r) value 0.9735. That shows strong correlation to length-weight relationship male cuttlefish, and both the combination.

According to Andy Omar (2012) *in decision*, Ramli (2014), the value of a correlation coefficient ranges from 0.70 - 0.89 and shows strong correlation, while the value of a correlation coefficient ranges about this research from 0.90 - 1.00 showed a very strong correlation.

CONCLUSION

According to analysis data result about length–weight relationship of cuttlefish (*Sepia pharaonis)* that landed by Muncar Fisherman in Banyuwangi can take conclusions as follows:

1. Species composition of cuttlefish that landed by Muncar fisherman, Banyuwangi, there are 3 species: *Cumi Zebra* (*Sepia pharaonis*) with 92.6%, *Cumi Karang* (*Sepia latimanus*), *Cumi Pasir* (*Sepia esculenta*) with each presentation amount 4.7% and 2.7%.
2. Growth type from dominant cuttlefish which landed in Muncar, Banyuwangi has allometric negative, that is mean the the growth of length is faster than increasing of weight.
3. The b values (regression coefficient) obtained in the total sample, males and females respectively are 2.55, 2.56, and 2.57.

REFERENCES

Badan Pusat Statistik, 2012. Statistik Ekspor Hasil Perikanan Menurut Komoditi, Provinsi Dan Pelabuhan Asal Ekspor.

Kementerian Kelautan dan Perikanan, Jakarta.

Direktorat Jendral Perikanan Tangkap, 2015. Statistik Perikanan Tangkap Di Laut Menurut Wilayah Pengelolaan Perikanan Negara Republik Indonesia (WPP-NRI), 2005-2014. Jakarta.

Prihatiningsih, Sadhotomo, B., Taufik, M., 2013. Dinamika Populasi Ikan Swanggi (*Priacanthus tayenus*) Di Perairan Tangerang–Banten. Balai Penelit. Perikan. Laut Vol 5, No 2.

Ramli, F., 2014. Hubungan Panjang Bobot Dan Faktor Kondisi Ikan Kembung Lelaki *Rastrelliger kanagurta* (Cuvier, 1817) Di Tempat Pendaratan Ikan Sumpang Binangae, Kabupaten Barru Skripsi. Universitas Hassanuddin. Makassar.

Sparre, P., Venema, S.C., 1999. Introduksi Pengkajian Stok Ikan Tropis. Kerjasama FAO Dan Pus. Penelit. Dan Pengemb. Pertan. Jkt.

Sudirman, 2013. Mengenal Alat dan Metode Penangkapan Ikan. Rineka Cipta, Jakarta.