

# Weight–length relationship of Sclerodactylidae sea cucumber, *Ohshimella ehrenbergii* (Selenka, 1868) (Echinodermata: Holothuroidea), from Karachi coast, Pakistan

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## Abstract

This study was conducted to determine weight–length relationships (WLRs) of sea cucumber *Ohshimella ehrenbergii* that was sampled during three seasons, pre-monsoon, monsoon and post-monsoon, in January to December 2014 from Sunehri coast in the Arabian Sea, Pakistan coast. The results showed that *Ohshimella ehrenbergii* has negative allometric growth characteristics in all seasons. Namely, the value of  $b$  was calculated as 0.924 in pre-monsoon, as 1.044 in post-monsoon, as 0.982 in monsoon and as 0.992 in combined data with significant differences from isometric growth.

## Introduction

According to the World Register of Marine Species (WoRMS) (2014) the Sclerodactylidae sea cucumber, *Ohshimella ehrenbergii* (Selenka, 1868) (Echinodermata: Holothuroidea), lives in rock crevices or under stones and is distributed in south-eastern Arabia, western India, Pakistan, Maldives and Sri Lanka. Knowledge on biological features such as weight–length relationships (WLRs) of sea cucumbers is an important tool for marine biologist. The WLRs can be used as a tool in stock assessment studies, fish biology, fish population dynamics and also fisheries research studies. In Pakistan, monsoon winds carry moisture from the Indian Ocean and bring heavy rains between May and September. More than fifty per cent of annual rainfall occurs in the monsoon season, mostly from July to August (Hussaina et al. 2010). Mobilised sea life during pre- and post-monsoon seasons directly or indirectly affect the life of marine flora and also fauna species such as the sea cucumber *Ohshimella ehrenbergii*. In Pakistan, there is no knowledge on WLRs of *Ohshimella ehrenbergii*. The present study deals with first time seasonal variation of the WLRs in *Ohshimella ehrenbergii* from the Sunehri coast, Karachi, Pakistan.

## Materials and methods

### Sample collection

Sea cucumbers were collected by hand especially in the intertidal area from the Sunehri coast (around 24°52'33.49"N and 66°40'40.20"E) (see Figure 1). A total of 34 sea cucumbers *Ohshimella ehrenbergii* were collected in 2014 at three different periods:  $n = 10$  in pre-monsoon (January to April),  $n = 12$  in

monsoon (May to September) and  $n = 12$  in post-monsoon (October to December).

### Weight–length relationships (WLRs):

The total length ( $TL$ ) (cm) and weight (g) data were measured for each sea cucumber. Total length from mouth to anus was measured using a flexible ruler after allowing the sea cucumber to relax in sea water for 5 min. Wet weight and total length were measured to the nearest 0.1 g and 0.1 cm, respectively.

Least squares regression analysis was applied using MS Excel software to calculate the WLRs parameters for sea cucumber specimens. The WLRs was estimated as follows:  $W = aTL^b$ , (where  $W$  is the wet body weight (g),  $TL$  is the total length (cm),  $a$  is the intercept, and  $b$  is the slope of the regression line).

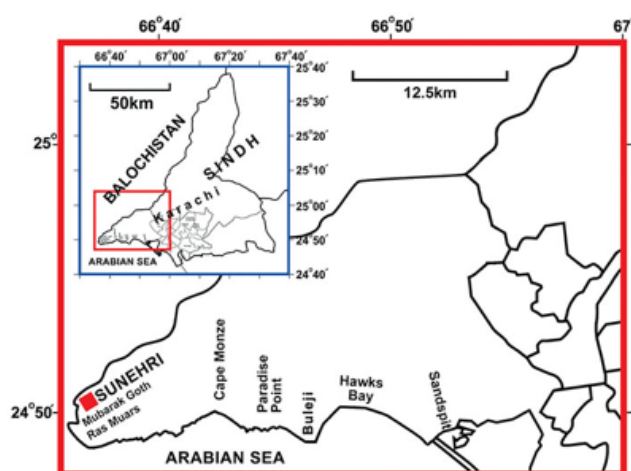
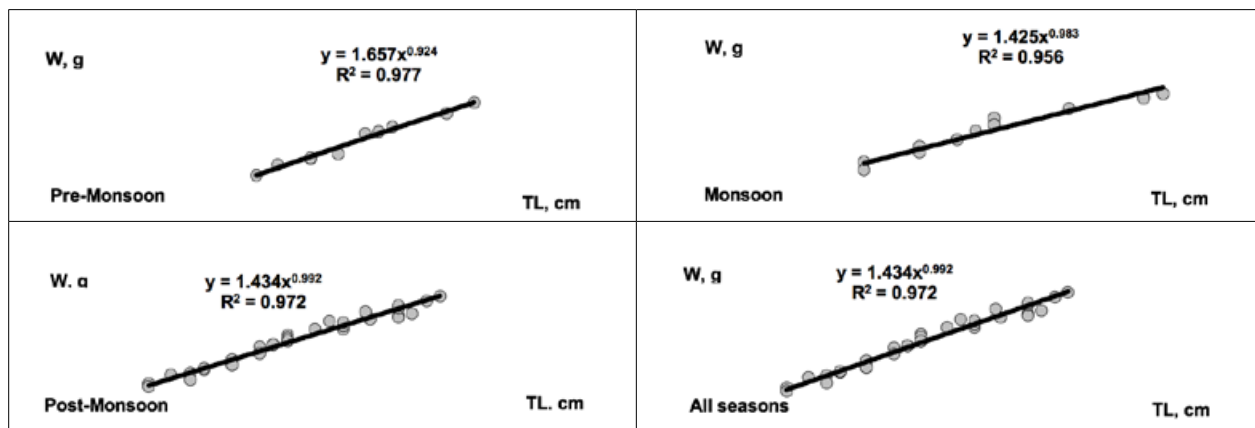


Figure 1. Study area.

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**Figure 2.** Total weight–length relationships (WLRs) of *Ohshimella ehrenbergii* in pre-monsoon, monsoon, post-monsoon and combined seasons during January to December 2014.

**Table 1.** Seasonal length and weight results of *Ohshimella ehrenbergii* samples collected during pre-monsoon, monsoon and post-monsoon seasons in 2014 from Sunehri coast.  $L_{mean}$  = mean length,  $L_{min}$  = lowest length,  $L_{max}$  = maximum length,  $L_{SE}$  = Standard error of length;  $W_{mean}$  = mean weight,  $W_{min}$  = minimum weight,  $W_{max}$  = maximum weight,  $W_{SE}$  = Standard error of weight.

Seasons	N	Length (cm)				Weight (g)			
		$L_{mean}$	$L_{SE}$	$L_{min}$	$L_{max}$	$W_{mean}$	$W_{SE}$	$W_{min}$	$W_{max}$
Pre-monsoon	10	7.63	0.81	4.0	12.0	10.81	1.09	6.0	16.5
Monsoon	12	9.17	0.82	5.5	13.5	12.56	1.06	6.7	17.5
Post-monsoon	12	10.57	0.87	4.0	14.5	15.23	1.27	5.5	20.3
Combined	34	9.21	0.51	4.0	14.5	12.99	0.72	5.5	20.3

Comparison of the difference of slope ( $b$ ) value from isometric growth ( $b = 3$ ) for seasons (pre-monsoon, monsoon and post-monsoon) and combined data, Pauly's  $t$ -test was performed (Pauly 1984). Comparison of the difference of correlation coefficient ( $r$ ) from zero  $t$ -test was calculated (Snedecor and Cochran 1989).

## Results and discussion

The WLRs results of *Ohshimella ehrenbergii* in pre-monsoon, monsoon and post-monsoon seasons are showed in Table 1. Mean total length of *Ohshimella ehrenbergii* was 4.0–12.0 cm (mean:  $7.63 \pm 0.81$  cm,  $n = 10$ ) in pre-monsoon, 5.5–13.5 cm (mean:  $9.17 \pm 0.82$  cm,  $n = 12$ ) in monsoon, and 4.0–14.5 cm (mean:  $10.57 \pm 0.87$  cm,  $n = 12$ ) in post-monsoon. Overall mean total length was 4.0–14.5 cm (mean:  $9.21 \pm 0.51$  cm,  $n = 34$ ).

### Weight–length relationships (WLRs)

The WLRs of the *Ohshimella ehrenbergii* samples that were collected during pre-monsoon, monsoon and post-monsoon seasons showed that *Ohshimella ehrenbergii* have negative allometric growth (Pauly's  $t$  test,  $P > 0.05$ ).

The values for the exponent ( $b$ ) of all seasons remain mostly out of the expected range of  $b = 2.5$  and  $b = 3.5$ . These results may be due to different body shape of the sea cucumber than other marine animals such as fish and crustaceans. However, comparison of the difference of correlation coefficient ( $r$ ) from zero  $t$ -test (Snedecor and Cochran 1989) was applied and the values of ' $r$ ' for pre-monsoon ( $r = 0.976$ ), monsoon ( $r = 0.955$ ), post-monsoon ( $r = 0.984$ ) and combined data ( $r = 0.971$ ) are different from zero ( $P < 0.05$ ), indicating that sea cucumber *Ohshimella ehrenbergii* has higher correlation in WLRs equations.

## References

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