Sex ratio, length-width and weight relationships of the silver-mouth turban *Turbo argyrostoma* Linné, 1758, Indonesia

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A total of 164 silver-mouth turbans were collected over a 3 month period. The smallest sexually mature snail had 36 mm shell diameter. The sex of 137 specimens was identified (56 males and 81 females; M:F = 1:1.2). The largest snail (male) had a shell diameter of 62 mm. Relationships of shell length (mm) as a function of shell diameter (mm) was calculated ($y = 1.8503\ x^{0.789}$; $r^2 = 0.7636$; n = 164). The relationship of total wet body weight (g) as a function of shell diameter (mm) was calculated for the same snails ($y = 2.072\ x^{2.2331}$; $r^2 = 0.7592$).

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INTRODUCTION

The silver-mouth turban *Turbo (Marmarostoma) argyrostoma* Linné, 1758 is found along the south coast of Jawa (Dharma, 1988). Local fishermen consume the meat and the shell is available for handicraft or any other purpose and exported to foreign countries. The price of the polished shell is approximately 2 US $ with a shell diameter of 50 mm (Anonymous 2000). Live snails are sold for Rp. 3.500 per kg. Studies of *T. argyrostoma* are lacking compared to the commercially more famous *Turbo marmoratus*. Compared to *T. marmoratus*, the silver-mouth turban is still abundant in nature, but exploitation of *T. argyrostoma* populations can be expected to increase in the future. Basic data will then be needed for conservation purposes. Therefore, the present study investigates some biological characteristics of *T. argyrostoma* with emphasis on its reproduction.

MATERIALS AND METHODS

Monthly random collection of *T. argyrostoma* was made from May 2000 to July 2000 in the coastal water of Ujung Genteng, South Sukabumi, East Jawa. Sampling was carried out twice during the night when the turban snails were active during low tide. Shell height and shell diameter (width) were measured by Vernier caliper (0,01 mm) and the wet weight was measured to ± 0,01 gram. The shell was cracked for identification of gonads of the snails. The gonad of a mature male is white to cream in colour, while the mature female gonad is green to deep green.

RESULTS AND DISCUSSION

Two species of *Turbo* were found at the study site: the silver-mouth turban *Turbo argyrostoma* and the gold-mouth turban *Turbo chrysostomus* (Dharma, 1988). Both species were found in the same feeding ground rich in macroalgae. On the face of visual estimates the density of *T. argyrostoma* was higher compared to *T. chrysostomus*. The typical habitat of the two species comprises a wide reef flat exposed at spring low tides, and with a gently sloping bottom of uniform pavement substratum that support an abundance of the algae *Sargassum, Enteromorpha, Ulva,* and the seagrass *Thalassia.*

Shell diameter and shell height

Correlation between shell diameter and shell height of *T. argyrostoma* showed a positive logarithmic regression expressed by the equation $y = 1{,}8503\ x^{0{,}789}$ ($R^2 = 0{,}764$; $P < 0{,}001$; n =164).

The correlation was almost linear for shells having a diameter < 35 mm while larger shells displayed much scatter of the correlation (Fig. 1). The coefficient of correlation was therefore quite low (0.764) when calculated for all data points.

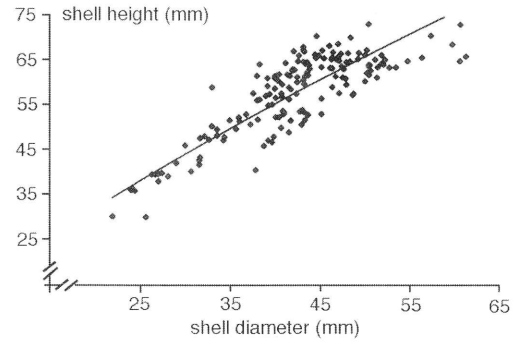

Figure 1. Correlation between shell diameter and shell height of *Turbo argyrostoma*.

Shell diameter and total body wet weight

Regression analysis of shell diameter and total body wet weight of *T. argyrostoma* showed a positive logarithmic regression expressed by the equation $y = 2{,}072\ x^{2.233}$ ($R^2 = 0{,}759$; $P < 0{,}001$; n = 164).

A marked scatter of data points was expected in this type of correlation since the gonads constitute a significant part of the total body weight. The total body weight is influenced by the state of spawning at the time of collection. The scatter was most marked in snails with a shell diameter of 40-55 mm (Fig. 2). The coefficient of correlation was 0.759 when calculated for all 164 snails.

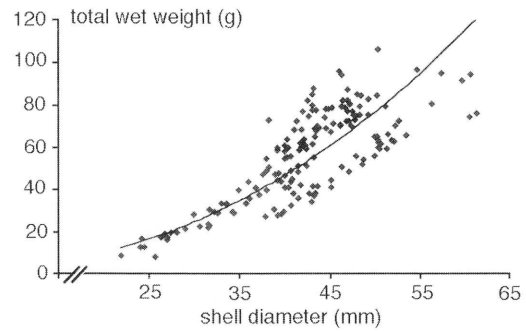

Figure 2. Correlation between shell diameter and total body wet weight of *Turbo argyrostoma*.

Sex ratio

Sex could not be identified with certainty by visual inspection of gonads if individuals had a shell diameter smaller than 36 mm. The present material encompassed 137 individuals of *T. argyrostoma* having 36–62 mm shell diameter. Of these, 56 were males and 81 females. The overall ratio of males to females was 1 : 1.2. The occurrence of sex with size is shown in Table 1

Table 1. Sex as a function of shell diameter of *Turbo argyrostoma*

Diameter (mm)	Male		Female	
	Number	%	Number	%
36–40	13	37	22	63
41–45	18	40	29	60
46–50	15	41	24	59
51–55	6	60	4	40
56–60	3	60	2	40
> 60	1	-	0	-
Total	56		81	

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