

SEX RATIO IN *VIVIPARUS BENGALENSIS* (LAMARCK) (GASTROPODA :
VIVIPARIDAE)

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ABSTRACT

Sex ratio in *Viviparus bengalensis* varies with the size-groups of the species. Up to 25 mm. shell length the percentage of males and females are almost equal while 41.5% male and 50.3% female, and 36.98% male and 63.02% female were observed in 26 to 34 mm. and 35 to 40 mm. size-groups respectively.

INTRODUCTION

In population biology sex ratio plays an important role. The significance of study of sex ratio for any beneficial species lies with the fact that it serves as the basis of estimating gains precisely. There are a good number of edible molluscs in India of which *Viviparus bengalensis*, a banded pond snail is avidly consumed by animals as well as man. Different aspects of bioecology of this snail species have been studied by Annandale and Sewell (1921), Raut and Ghose (1976) and Raut (1978, 1980).

The ratio of males to female in *V. bengalensis* as presented by Annandale and Sewell (1921), however, differs significantly with the present study and is presented in this paper for a better understanding on the said problem.

MATERIALS AND METHODS

Viviparus bengalensis of different size composition were collected at random from a pond near Port Canning, West Bengal,

for a period of one year, March 1977 to February, 1978. On the 15th day of each month 500 specimens were brought to the laboratory and released in a large tray with sufficient amount of water. Males and females were counted based on the character of tentacle. Of the two tentacles, in male the right one is recurved and the left is straight while in females both are straight. To study the sex ratio in different age-groups the length of shell of the specimens collected was measured and grouped under size-groups, viz., 6 to 10 mm., 11 to 18 mm., 19 to 25 mm., 26 to 34 mm. and 35 to 40 mm. according to their shell length. It has been noticed that in this part of West Bengal *V. bengalensis* usually does not grow beyond 40 mm. in shell length.

OBSERVATIONS

In the period of 12 months a total of 6,000 specimens were collected and examined. Of the total snails 922 (441 ♂ and 481 ♀) were 6 to 10 mm., 1,383 (680 ♂ and 703 ♀) were 11 to 18 mm., 1,830 (880 ♂ 950 ♀) were 19 to 25 mm., 1135 (471 ♂ and 664 ♀) were

26 to 34 mm and 730 (270 ♂ and 460 ♀) were 35 to 40 mm. Out of 6,000 snails 2742 (45.7%) were males and 3,258 (54.3%,

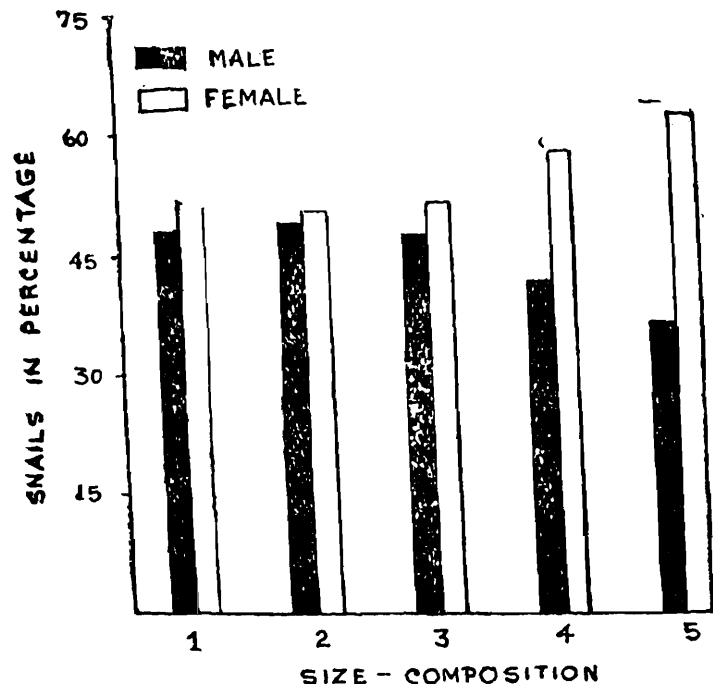


Fig. 1. Sex ratio in different size-composition of *Viviparus bengalensis*. (1=6 to 10 mm. 2=11 to 18 mm. 3=19 to 25 mm. 4=26 to 34 mm 5=35 to 40 mm.).

were females. A comparative account of the sex ratio in terms of percentage in

different size-groups has been shown in Fig. I. The distribution of males and females in different size-groups was also different in different months of the year (Table I). But the impact of seasons on the sex ratio could not be detected which may be observed also from Table I. However, it is observed that the number of females, in general, is always higher than the males. In the younger size-group, i.e. 6 to 10 mm the females were higher only by 4.27% while in 11 to 18 mm. and 19 to 25 mm. size-groups the differences were by 1.66% and 3.84% respectively. Surprisingly, the females were 16.8% and 26.4% higher than those of males of 26 to 34 mm. and 35 to 40 mm. size-groups respectively. In over all, irrespective of size-groups, the females were 8.6% higher in occurrence.

DISCUSSION

Prosobranchs, in general, are thought to be dioecious but in fact they are protandric hermaphrodites (Orton, 1909 ; Bacci, 1947 a, b, 1948). They function first as males, then pass through a transitional phase, and

TABLE I. Distribution of males and females in various size groups of *Viviparus bengalensis* in different months in a pond near Port Canning. West Bengal.

Size groups	Sex	M O N T H S												Total
		Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	
6-10 mm	Male	10	10	28	40	70	52	48	51	40	34	31	27	441
	Female	15	10	32	43	79	59	52	51	40	37	33	30	481
11-18 mm	Male	20	30	48	60	88	74	76	61	60	62	61	40	680
	Female	24	32	50	70	90	75	76	60	61	63	62	40	703
19-25 mm	Male	34	46	64	90	106	88	87	82	76	70	70	67	880
	Female	40	51	72	94	112	97	96	86	80	74	76	72	950
26-34 mm	Male	12	13	30	50	71	55	54	43	43	36	34	30	471
	Female	20	22	44	60	85	72	69	65	65	63	55	47	664
35-40 mm	Male	8	11	19	26	39	34	30	42	22	15	14	10	270
	Female	12	13	30	48	61	54	55	44	42	36	34	31	460

subsequently function as females for the rest of life (Hyman, 1967). Recently, Wells and Lalli (1977) have given a detailed account of the sex ratio in two Caribbean gastropods, *Coralliophila abbreviata* and *C. caribaea*. However, these studies are restricted to estuarine and marine forms. In *Viviparus bengalensis*, according to Annandale and Sewell (1921) the number of males and females prior to the attainment of sexual maturity is almost equal like that of present study while they reported the ratios of females to males were 4 : 1 and 8 : 1 at the end of first and second year respectively. The present study did not support Annandale and Sewell (1921) with the point in terms of proportion of females to males. In general females are always more than 50% and maximum females (63.02%) are found in the older size-groups. From the present study it appears that the ratio of female is never double or even nearer to that of male. According to Orton (1920) larger specimens of *Patella vulgata* were 64% females while Wells and Lalli (1977) observed 51.9% males and 47.0% females in *Coralliophila abbreviata*.

It is evident that in most prosobranchs the number of females is at an increasing rate with the increase of age. This indicates that the life-span of females is somewhat longer than the males and the mortality rate in males is increasingly higher with the age. The higher percentage of females may be explained as an adaptation for maintaining a high population level so that they may represent themselves as a dominative malaco-fauna in competition over others.

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