

Population Structure & Sexual Dimorphism in Gastropod *Hemifusus pugilinus* (Born)

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Sex ratio, sexual dimorphism and age at first maturity in *H. pugilinus* were analysed. The females were dominant throughout the year in larger length groups while males were dominant in smaller length groups. Gonadial smear showed the age at first maturity in males in 61-65 mm length group and in females in 65-70 mm length group. F-test showed the existence of sexual dimorphism in *H. pugilinus*. But the SEM studies on the radula of both males and females showed no marked sexual dimorphism in the radular morphology.

The understanding of any population structure can be possible only when the sex composition and sexual dimorphism of a given population are clearly known. The sex ratio also gives an indication to the difference between the growth rate of 2 sexes, if any.

Population studies are scanty on *Hemifusus pugilinus* (Born) (Gastropoda - Volemidae) an edible¹ species distributed abundantly in the coast of Porto Novo forming an important component of benthic community. In the present investigation an attempt has been made to find whether the males and females of this species follow the 1:1 ratio of Null hypothesis.

The specimens (1588) for the present investigation were collected monthly during November 1984 to October 1985, from the coastal waters of Porto Novo (lat. 11°30' N; long. 90°38' E) using trawl net. The duration of collection was confined to 1 h during which the net swept a horizontal benthic floor of 3 km between 3 and 13 fathom lines. The males were identified by the presence of a well developed penis, while the females by its absence. Sexual dimorphism was analysed applying F test to the mean shell heights of male and female respectively. Since the radula of some gastropods shows sexual dimorphism²⁻⁴ among males and females of same species, the radulae of *H. pugilinus* were coated with gold vapour and observed with S-180 Stereoscan SEM. To find the first maturity stage the gonadial smear analysis^{5,6} was done with both males and females at all length groups, every month. The observed value of every month was tested against the expected 1:1 ratio by applying the 'chi square' test.

The ratio of male to female during the study period is given in Table 1. In the population of *H. pugilinus* the females are dominant over males throughout the year and more so in April. The frequency of occurrence of males and females under different length groups (Table 2) shows that the dominance of males over females is generally in the smaller size groups (61-65, 66-70 and 71-75 mm). The female dominance is noted in the larger length groups (81-85, 86-90 and 91-95 mm) while both males and females are codominant in 56-60 and 76-80 mm length groups. Females showing dominance only in larger size groups has also been noticed in *Buccinum undatum*⁷. The monthly gonadial smear obser-

Table 1—Sex Ratio during Various Months
in *H. pugilinus*

Month	Males		Females		M:F	Chi square value
	No.	%	No.	%		
	(D.F. = 1)					
1984						
Nov.	73	46.2	85	53.8	0.86:1	0.912
Dec.	74	47.4	82	52.6	0.90:1	0.410
1985						
Jan.	80	44.4	100	55.6	0.80:1	2.222
Feb.	64	43.8	82	56.2	0.78:1	2.218
Mar.	75	47.8	82	62.2	0.91:1	0.312
Apr.	32	34.8	60	65.2	0.53:1	8.520
May	56	46.3	65	53.7	0.86:1	0.130
Jun.	44	42.3	60	57.7	0.73:1	0.669
Jul.	55	47.4	61	52.6	0.90:1	2.462
Aug.	54	45.4	65	54.6	0.83:1	0.310
Sep.	54	44.6	67	55.4	0.81:1	1.017
Oct.	49	41.5	69	58.5	0.71:1	1.396

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Table 2—Sex Ratio in Different Length Groups in *H. pugilinus*

Length group (mm)	No of males (M)	No of females (F)	Ratio*	
			M to F	F to M
56-60	64	64	1.00	1.00
61-65	160	72	2.20	0.45
66-70	224	192	1.17	0.86
71-75	120	88	1.36	0.73
76-80	56	56	1.00	1.00
81-85	96	112	0.86	1.17
86-90	32	156	0.21	4.88
91-95	84	186	0.45	2.20

* > 1 shows dominant over the other sex

variation on different length groups shows that the first indication of mature cells appear in 61-65 mm length group in the case of males and in 65-70mm length group in the case of females. This phenomenon of protandric nature has also been observed in *Nassarius obsoletus* and *Nassa stolata*⁸. Chi square analysis shows significant deviation from the expected 1:1 ratio at 0.1% level (Table 1). The results of F test show that differences between the shell heights of males and females are significant at 1% level. This

fact establishes sexual dimorphism in size of males and females.

More than 50 radulae from male and female were observed under SEM and no difference could be noted. The radula of *H. pugilinus* is of typical rachiglossate type with one median rachidian tooth and 2 lateral teeth one on either side of the central. The radula of *H. pugilinus* shows no sexual dimorphism whereas in some other gastropods sexual dimorphism is observed²⁻⁴.

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