Central Marine Fisheries Research Institute, Cochin - 682 014.

N. KALIAPERUMAL*
V. S. K. CHENNUBHOTLA
M. NAJMUDDIN
J. R. RAMALINGAM
S. KALIMUTHU

* Present address : Regional Centre of CMFRI, Marine Fisheries — P.O., Mandapam Camp.

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ALLOMETRIC RELATIONSHIP IN THE HARD CLAM *MERETRIX MERETRIX* (LINNAEUS)

ABSTRACT

Length-weight and allometric relationship between different morphological parameters in the hard clam *Meretrix meretrix* (Linnaeus) were studied. In the present study analysis of variance revealed no significant difference between male and female clams. Significant difference were found between immature, mature, male and female. The correlation co-efficients (r) for immature, male and female are highly significant. Allometric relationship in all combinations are significantly related to each other.

THE HARD CLAM *Meretrix meretrix* contributes a considerable percentage of the clam resources in the Vellar Estuary and adjacent waters. Present study was carried out in the hard clam to understand the length-weight relationship and other allometric relationship between various morphological attributes.

Random samples of *M. meretrix* were collected from the mouth of Vellar Estuary. The length, height and breadth of the clams were measured by using vernier calipers to the nearest 0.1 mm. About 200 males and 200 females of various size groups and 30 young

clams were used for the present study. The live wet weight of the clam was determined after washing off the sediment particles adhering to the shell. Soft body of the animal was removed, blotted to remove excess moisture and weighed. The shells and dry body weight were also weighed. All these above weighings were carried out using a single pan electrical balance to the nearest 0.1 mg. The regression equation log Y = log a + b log X was calculated separately for immature, male and female clams.

Length-weight relationship : To find out the differences if any between the male, female and immature specimens of *M. meretrix*, the linear equation was fitted separately.

The regression equation for immature, male, female and mature clams of *M. meretrix* are :

Immature : Log W = 2.5340 + 0.6442 Log L
Male : Log W = - 0.1667 + 2.8197 Log L
Female : Log W = - 0.1452 + 2.8069 Log L
Mature : Log W = - 0.1561 + 2.8134 Log L

Analysis of variance revealed no significant difference between male and female clams (Table 1). Significant differences were found between immature, mature, male and female clams of *M. meretrix* (Tables 2, 3, 4). The correlation coefficients (r) for immature, male and female were highly significant.

TABLE 1. *Analysis of coefficients for testing differences in regression of male and female* M. meretrix

Source of deviation	df	Sum of squares	Mean squares	Observed F
Deviation from individual regression	396	10.3856	0.0262	0.1679 (Not significant)
Difference between regressions	1	0.0044	0.0044	

TABLE 2. *Analysis of coefficients for testing differences in regression of immature and mature* M. meretrix

Source of deviation	df	Sum of squares	Mean squares	Observed F
Deviation from individual regression	426	10.4004	0.0244	4.0040 (significant)
Difference between regressions	1	0.0977	0.0977	

TABLE 3. *Analysis of coefficients for testing differences in regression of immature and male* M. meretrix

Source of deviation	df	Sum of squares	Mean squares	Observed F
Deviation from individual regression	226	4.9473	0.02189	11.6624 (significant)
Difference between regressions	1	0.2553	0.25530	

TABLE 4. *Analysis of coefficients for testing differences in regression of immature and male* M. meretrix

Source of deviation	df	Sum of squares	Mean squares	Observed F
Deviation from individual regression	226	5.4667	0.0245	6.9266 (significant)
Difference between regressions	1	0.1700	0.1700	

TABLE 5. *Allometric relationships between various morphological characters of* M. meretrix *(immature n. 30)*

Parameters	log a	b	r
L + H	0.4614	0.5820	0.70356
L + B	0.5184	0.3568	0.72024
L + W	2.5314	0.6442	0.61320
L + Wb	-0.4754	2.2696	0.69681
L + Wd	-7.6936	8.2887	0.89457
L + Ws	2.5062	0.4437	0.30700
H + B	0.4108	0.4668	0.57579
H + W	2.8106	0.4474	0.35230
H + Wb	0.4754	2.2696	0.69681
H + Wd	-9.0690	9.1529	0.81764
H + Ws	2.0326	0.8640	0.49458
B + W	2.3161	1.0623	0.67830
B + Wb	-0.4314	2.9153	0.60034
B + Wd	-9.0690	9.1529	0.81764
B + Ws	2.4852	0.6004	0.27867
W + Wb	-2.2972	1.4025	0.45236
W + Wd	-4.3243	4.5177	0.51248
W + Ws	0.5053	0.7656	0.55650
Wb + Wd	-1.1265	2.2205	0.78100
Wb + Ws	2.7638	0.1267	0.20480
Wd + Ws	3.0338	0.0426	0.27300

P < 0.001

TABLE 6. *Allometric relationships between various morphological characters of* M. meretrix *(immature n. 200)*

Parameters	log a	b	r
L + H	-0.0692	1.0011	0.98335
L + B	-0.3086	1.0337	0.97465
L + W	-0.1667	2.8197	0.94017
L + Wb	-1.6938	3.1407	0.98610
L + Wd	-1.6938	2.7958	0.97335
L + Ws	1.1183	1.9324	0.63762
H + B	-0.2505	1.0409	0.97229
H + W	-0.1998	2.9602	0.99309
H + Wb	-1.2073	3.0076	0.98686
H + Wd	-1.4612	2.7680	0.96796
H + Ws	0.5610	2.3656	0.78537
B + W	0.5829	2.7935	0.98789
B + Wb	-0.3706	2.8087	0.97148
B + Wd	-0.7300	2.6126	0.96490
B + Ws	0.9398	2.4085	0.84288
W + Wb	-0.9863	1.0120	0.98984
W + Wd	-0.9498	0.8620	0.90023
W + Ws	0.2106	0.9125	0.90307
Wb + Wd	-0.4010	0.9348	0.99794
Wb + Ws	0.7923	0.9880	0.99965
Wd + Ws	1.4076	0.9918	0.93988

P < 0.001

TABLE 7. *Allometric relationships between various morphological characters of* M. meretrix *(female n. 200)*

Parameters	log a	b	r
L + H	0.2216	0.8250	0.80931
L + B	0.0940	0.7897	0.87980
L + W	0.1452	2.8069	0.93168
L + Wb	-1.4032	3.0146	0.97156
L + Wd	-1.2218	2.5094	0.82900
L + Ws	1.8129	1.5090	0.48718
H + B	-0.2295	1.0275	0.99130
H + W	-0.1717	2.9436	0.99599
H + Wb	-1.1844	3.0050	0.98741
H + Wd	-1.6668	2.8972	0.97574
H + Ws	-0.3336	2.9267	0.97130
B + W	0.7995	2.6409	0.96319
B + Wb	-0.1824	2.6891	0.92560
B + Wd	-0.9651	2.7807	0.91515
B + Ws	0.3098	2.8558	0.97359
W + Wb	-1.0004	1.0191	0.98954
W + Wd	-1.2506	0.9292	0.92497
W + Ws	0.4932	0.8483	0.82513
Wb + Wd	1.7419	0.7164	0.73440
Wb + Ws	0.8445	0.9668	0.96853
Wd + Ws	1.4466	0.9772	0.95497

P < 0.001

Changes in the constant allometry of length weight relationship are associated with increase in size and sexual maturity as observed in *Anadara rhombea* (George John, 1980) and in *K. opima* (Kalyanasundaram, 1982). Kuenzler (1961) and Shafee (1976) reported in mussels that the allometry of length weight relationship are associated with sexual maturity.

Allometric relationships between various morphological attributes : Presently the relationships between length, width, height, whole live weight, shell weight, body wet weight and body dry weight of immature, male and female of *M. meretrix* were studied in all permutations and combinations using linear regression techniques and correlation coefficients (Simpson *et al.*, 1960; George John, 1980). The details are presented in Tables 5, 6 and 7. From the Tables it is evident that

the correlation co-efficient values for various combinations of body as well as shell characters taken for the study from immature, male and female clams are significant ($P < 0.001$). Allometric relationships in all combinations showed that all these factors are significantly related to each other as observed by earlier workers (George John, 1980; Kalyanasundaram, 1982).

The authors are thankful to the Director, CAS in Marine Biology for providing the facilities. One of them (RJ) thanks the ICAR and UGC for financial assistance.

CAS in Marine Biology,
Parangipettai 608 502.

R. JAYABAL
M. KALYANI

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ANTIMICROBIAL ACTIVITIES OF MARINE ALGAE FROM THE INDIAN COAST

ABSTRACT

Thirteen species of matured marine algae, collected from the intertidal regions around Mandapam, Okha and Malvan Coasts, were extracted with chloroform-methanol and the extracts were subjected to microbial screening for antibacterial and antifungal activities. Most of the extracts inhibited the growth of *Escherichia coli, Bacillus subtilis* and *Candida albicans*. The extract from *Chnoospora fastigiata* showed pronounced antifungal activity against *Saccharomyces cerevesciae* and *Candida albicans*, whereas *Entermorpha flexuosa* exhibited marked activity against *E. coli*. The Minimum Inhibitory Concentration (MIC) in µg/ml was determined in each case.

Introduction

THE SEAS and oceans provide an abundant resource of marine organisms which have been attracting the attention of biologists as well as chemists in their search for compounds of pharmacological interests. Extracts of marine organisms have shown antiviral, antifungal and antibacterial activities (Burkholder and Sharma, 1969; Su *et al.*, 1973). Bhakuni and Silva (1974) have reported some biodynamic substances from marine flora and fauna. Biologically active compounds have also been obtained by Ruggieri (1976) and Grant and Mackie (1977). Using different modes of screening, the biological activities of algal extracts have been reported by Fenical *et al.* (1973) and by Mynderse *et al.* (1977). Extracts of marine animals have been screened for cardiovascular activities by Kaul *et al.* (1977). The results of biological screening of about 140 marine organisms collected from the Indian Coast by the National Institute of Oceanography, Goa (India) in collaboration with the Central Drug Research Institute, Lucknow (India) under an Indo-US Project have been reported (Naqvi *et al.*, 1980; Kamat *et al.*, 1981; Naik *et al.*,