

Sexual Size Dimorphism On Some Penaeid Shrimp In Sudanese Red Sea

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Abstract: In Sudanese Red Sea, Shrimp Morphometric relations were undertaken, on some penaeid species: *Penaeus monodon*, *Penaeus indicus*, *Penaeus semisulcatus*, *Metapenaeus monoceros*, *Trachypenaeus curvirostris* and *Metapenaeus stebbingi*. Females were larger than males in all studied species, the largest species was *P. semisulcatus* and the smallest one was *Trachypenaeus curvirostris*, which was 6g maximum weight during the study. Table 1. Some of body measurements Sexual dimorphism obtained in all morphometric measurements of *P. semisulcatus* and *T. curvirostris*. However, no sexual dimorphism in *P. monodon*'s morphometric measurements, in *M. monoceros* sexual dimorphism in length measurements and in *P. indicus* only in total length. The length weight relationship of studied shrimps differs according to the sex. Both sexes of *T. curvirostris* and *P. semisulcatus* shows sexual dimorphism in total length, carapace length and body weight, in *P. monodon* was no sexual dimorphism, *P. indicus* sexual dimorphism was in length measurements and in *M. monoceros* only in body weight.

Keywords: Sexual - Size - Dimorphism - Penaeid - Shrimp - Sudanese - Red Sea.

1. Introduction and Literature Review:

The Sudanese Red Sea shoreline is about 750km long. Creeks or Mersas (Usually khore drainage areas), cut through fringing reefs. There are 76 Mersas along the Sudanese coast, these Mersas are the most important artisanal fishing sites of shrimp Mishrigi *et al.*, 1993). Opposite to delta Baraka river and up to south of Suakin coral free flat, shallow muddy trawlable area of 640 km² exists, here the shrimp fishing grounds occur off shore in depths of 9 to 27 m (Branford, 1980). In Sudan most of the shrimp catch comes from the area especially around the Gulf of Agig (Ross Sea Foods, 1979). At least 8 penaeid species of shrimp are available in the trawlable area which are: *Penaeus monodon*, *P. semisulcatus*, *P. indicus*, *P. latisulcatus*, *P. japonicus*, *Metapenaeus monoceros*, *M. stebbingi* and *Trachypenaeus curvirostris*.

Penaeid shrimps are one of the important resources of the coastal fisheries in terms of value per unit catch and total value of the catch on world wide scale (Coche, 1982).

The present study aims to help in promoting national shrimp fishery and culture by contributing on basic information on shrimp biology.

The specific objective is to study:

Identify sexual size dimorphism in some penaeid shrimp

Penaeids are an aquatic (marine) crustacean arthropod. They belong to the order Decapoda, suborder Natantia, Family Penaeidae and genus Penaeus. The term shrimps and prawns are common English names used synonymously due to the absence of systematic basis to mark a distinction. In general, shrimps refer to the smaller animals and prawns to the bigger ones. According to the FAO shrimps refer to marine penaeids while prawns refer to fresh water Palaemonids (Lacaniloa, 1989).

A variety of length weight measurements of penaeid shrimps, e.g. the carapace length, total length and body weight, are employed in biological investigations (Primavera & Leбата, 1998). Aquaculturists and industry practitioners whose profits depend on biomass commonly record body weight where as taxonomists and other researchers often prefer to length data, which are more easily measured in the field and are less liable to variations compared with weight. For instance Motoh (1981) used the carapace length for grading the life history phases of *Penaeus monodon* in males and females. Sexual size dimorphism appears to be well recognized in Penaeid species, which are characterized by large size (Penn and Hall, 1974). Females were found to attain larger size than males in a number of species. This has been documented for *Penaeus latisulcatus* (Zaghloul, 1995), *P. monodon* (ElHag, 1977), *Penaeus aztecus* (Parrack, 1979), *Penaeus indicus* (Devi, 1980), *Penaeus longistylus* (Penn, 1980; Dredge, 1990), *Penaeus vannamei* (Chow and Sandifer, 1991), *Metapenaeus endeavouri* (Buckworth, 1992), Jack-knife shrimp *Haliperiodes sibogae* (Ohtomi and Matsuoka, 1998) and *Penaeus monodon* (Primavera & Leбата, 1998). *Metapenaeus affinis* and *Parapenaeopsis stylifera* (Farmer, 1986). On the other hand no sexual dimorphism in size was found in *P. semisulcatus* (Abdel Razek, 1974; ElHady *et al.*, 1990; Yassin, 1992; Sallam, 1993; Zaghloul, 1995), *Penaeus japonicus* (Abdel Razek, 1974; Zaghloul, 1995), *Penaeus latisulcatus* (Ivanov and Krylov, 1980; Yassin, 1992).

2. Material and Methods:

Morphometric relations were established from shrimps:

Samples of: 1- market: (*P. monodon*). 2- mixed (market and trawlers shrimps) (*P. indicus*, *P. semisulcatus*, and *M. monoceros*). 3- Trawlers (*Trachypenaeus curvirostris* and *M. stebbingi*). The Morphometric measurements (fig.1), (length and weight) were according to Baybay, 1989 and Aly, 2001. The study samples ranged from 14 (in rare species) to 280 individuals.

Microsoft excel Programme was used for basic statistics of least square fits.

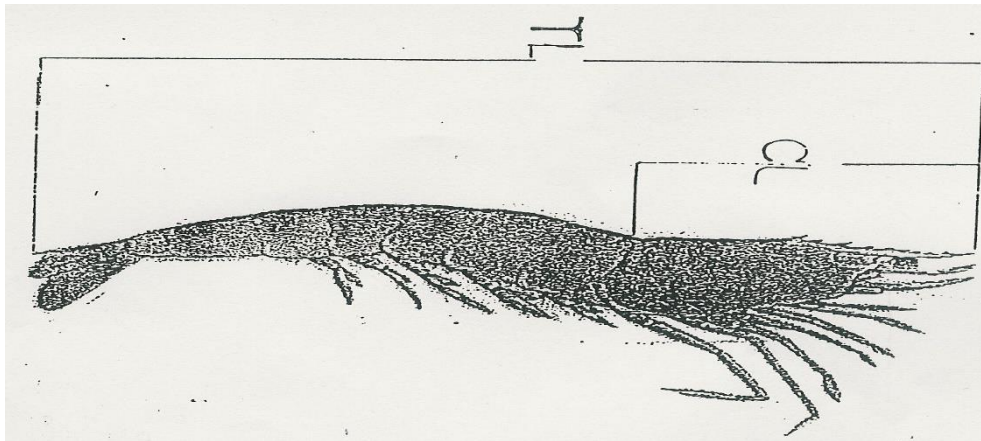


Fig 1. Some length measurements of the shrimp.

CL= carapace length.

TL= total length.

3. Result and Discussion:

The length-length (carapace length vs. total length) and length-weight relationships (carapace length vs. body weight, total length vs. body weight) of *Penaeus monodon*, *Trachypenaeus curvirostris*, *Penaeus semisulcatus*, *Metapenaeus monoceros*, *Metapenaeus stebbingi* and *Penaeus indicus* and the means, standard deviations, and t test of different size measurements for both sexes are summarized in table (1).

Table 1. Comparison between some body measurements of females and males of some shrimp species.

Parameter	Females		Males		T*	p
	Range	X ± SD	Range	X ± SD		
<i>P. monodon</i> (Female n= 124, Male n= 156)						
CL (cm)	2.5-7	4.17±0.95	2.5- 6.3	4.152±0.863	0.158	>0.05
TL (cm)	6.4-18.4	10.759±2.24	6.4- 16.8	10.789±2.081	0.108	>0.05
BW(gm)	1.7-53	10.26± 7.99	1.7- 37	9.972±6.896	0.247	>0.05
<i>T. curvirostris</i> (Female n= 89, Male n= 48)						
CL (cm)	1.07-3.1	2.460± 0.357	0.8-2.9	1.957± 0.277	9.145	<0.05
TL (cm)	3.5- 7.1	6.569± 0.869	4.5- 7.5	5.468± 0.491	9.658	<0.05
BW(gm)	0.3- 6	3.263± 1.163	0.8- 4	1.692± 0.525	10.83	<0.05
<i>P. semisulcatus</i> (Female n= 25, Male n= 18)						
CL (cm)	4.7- 6.7	5.892±0.437	4-6	4.616±0.47	9.18	<0.05
TL (cm)	13.6-8.9	16.48± 1.24	11.2-17.6	13.48± 1.21	2.62	<0.05
BW(gm)	24.5- 59	43.06± 7.69	12- 47	21.47± 6.95	9.61	<0.05
<i>P. indicus</i> (Female n= 20, Male n= 18)						
CL (cm)	3.5-8.8	4.94± 1.33	2.7- 5.5	4.55± 0.75	1.13	>0.05

TL (cm)	8.1-20.4	11.535±3.52	6.6- 14.4	10.97±2.04	3.104	<0.05
BW(gm)	2.9-57	12.11±3.165	1.7- 21.3	8.361±4.8 9	1.655	>0.05
<i>M. monoceros</i> (Female n= 14, Male n= 7)						
CL (cm)	2.5- 5.5	3.99± 1.04	3.1- 4.5	3.44±0.503	0.804	>0.05
TL (cm)	6.9- 14	10.76±2.56	8.7- 11.2	9.33±0.99	1.836	>0.05
BW(gm)	2.2- 26	11.75±8.29	4.5- 10.7	6.29±2.179	2.309	<0.05

t* =calculated

Females were larger than males in Studied species ,The largest species was *P. semisulcatus* and the smallest one of *T. curvirostris* which encountered during the study and it was only 6g weight as recorded by Branford (1980). In the present *P. monodon* is the third larger one. So this species may grow to larger sizes, the maximum total length of *P. monodon* recorded by Lacanilao (1989). was 336 mm and 330 mm total length by Racek (1959). In the Philippines, the largest male ever found was 81mm CL with 270 mm body length and 240 g weight (Motoh, 1981). all morphometric measurements of *P. semisulcatus* and *T. curvirostris* shows Sexual dimorphism . However no sexual dimorphism observed in *P. monodon*'s morphometric measurements, in *M. monoceros* sexual dimorphism found in length measurements and in *P. indicus* only was in total length.

So all or part of length weight relationship of studied shrimps differs according to the sex except in *P. monodon*.

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