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ON SEXUAL DIMORPHISM IN THE SHRIMP PALAEMON SP.
(DECAPODA: PALAEMONIDAE) FROM THE RED SEA
(With 7 Tables & One Fig & 2 Plate)

By

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التمايز الجنسي لنوع من جنس باليمون
/ ذوات العشر أرجل : بالمونيدى /
من البحر الاحمر

أحمد عبد الله ، حسن أبو الصهب

نوع من جنس شائع فى منطقة البحر الاحمر والجنسان به منفصلان . ولقد قيس ٣٥ صفة مورفولوجيه ، ٥ صفات عدديه للتمايز الجنسي لهذا النوع لعينات جمعت من منطقة البحر الاحمر جنوب مدينة سفاجا ب ١٥ كيلو متر .
لقد بينت النتائج أنه يوجد اختلاف بين الجنسين فى ١٠ صفات مورفولوجيه واما الصفات المورفولوجيه المتبقية والصفات العدديه لم تظهر أى اختلاف .

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SUMMARY

Palaemon sp. is common in the Red Sea coast and the sexes are separate. Sexual dimorphism in 35 morphological parameters and 5 meristic characters were investigated in a population of the shrimp *Palaemon sp.* collected from the Red-Sea coast. The results indicated that 10 morphological parameters are significantly different, while there are no significant differences in the recorded meristic characters.

Keywords: Sexual dimorphism, shrimp, Red Sea.

INTRODUCTION

Some studies on the taxonomy of shrimps arise certain difficulties in the taxonomy of certain taxa of this group. These difficulties are due to the failure of some workers to distinguish adequately between intraspecific variation and the differences species characterizing and sub-species, for example, the studies of BOUVIER (1913) and SCHMITT (1926) on *Caridina brevis* and *C. togoensis*, GORDON (1930) on *Caridina nilotica*, WILLIAMS (1980) and SMITH (1979) on *Paratya australiensis*, SMITH and WILLIAMS (1980) on *Paratya australiensis*, OBUID-ALLAH (1986) on *Caridina nilotica* and *C. africana*, and OBUID-ALLAH (1989) on *Atyaephyra desmaresti* and *A. desmaresti orientalis*.

Smith and WILLIAMS (1980) reported that full resolution of the difficulties must involve a study of the extent of variation within a population of a species, the present investigation was designed to study the extent of sexual variation of the population of *Palaemon sp.* collected from the Red-Sea coast, Egypt.

MATERIAL AND METHODS

Samples of *Palaemon sp.* were collected from the Red Sea coast in a site located 15km south of Safaga city (Fig. 1). The collection site is a rocky shore containing many patches of mangrove plant which are suitable for the species to find food and shelter (Pl. 1A). A zooplankton net was used to collect the shrimps by drawing it through roots of the mangrove plant. The shrimps (Pl. 1, B) were separated and preserved in 70% ethanol. The measurements of the different parts of the body were done by calibrated eye piece. The student t-test was applied to the

proportional characters, whereas Chi-square test was applied to the meristic characters.

RESULTS

During the course of looking for *P. pacificus* from the Red Sea coast, specimens of *P. Sp.* were collected. At the time of collection, (September, 1992, 1993), specimens of *P. sp.* were found in larger numbers than those of *P. pacificus*. Careful examination of morphological characters of the two species showed that they are different. So, the present study is a part of an investigation of the present species to know its identity and other morphological characters comparing with those of *P. pacificus*.

Palaemon sp. has separate sexes. It is a synchronous brooder and the females brood the young on the ventral surface of the abdomen between the pleopods from I to IV.

From Tables (1-6), it is obvious that the indices: rostrum length/rostrum depth, rostrum length/carapace length, total length/carapace length, total length/telson, 1st cheliped length/merus length, 2nd cheliped length/merus length, 2nd cheliped length/propodus length, abdomen length/carapace length, abdomen length/telson length, 1st pleopod length/endopodite length are significantly different in males and females.

DISCUSSION

The present investigation revealed that 10 proportional characters were found to be significant. No significant difference was recorded in the studied meristic characters. So, one may conclude that the armature of rostrum including the dorsal teeth, the pre-orbital teeth, the post-orbital teeth, the sub-apical teeth, and the ventral teeth (PL. 2, A-D) exhibit no remarkable variations in males and females. Consequently, such characters are good taxonomic ones in the species under investigation. Similar results were noticed by some other authors. HUSSEIN and OBUID-ALLAH (1981), worked on the prawn *Palaemon elegans* and observed no differences between the sexes in the number of dorsal and ventral teeth of rostrum. Also, OBUID-ALLAH (1987) studied *Caridina nilotica nilotica* and OBUID-ALLAH and ABOUL-DAHAB (in press) studied *Palaemon pacificus* observed no significant difference between males and females in the armature of rostrum including dorsal, pre-orbital and ventral teeth.

On the other hand, OBUID-Allah (1989) worked on *Atyaephyra desmaresti desmaresti* and *A. desmaresti orientalis* and observed no significant differences between males and females in the number of dorsal and ventral teeth of rostrum, while a significant difference was observed in the number of post-orbital teeth.

By comparing the morphometric indices studied in the present investigation with corresponding ones studied by different authors in other shrimps (Table, 7), one can conclude that *Palaemon sp.* of the present study resembles *Caridina nilotica nilotica* in six indices: namely total length/ carapace length, total length/ telson length, abdomen length/ carapace length, abdomen length/ telson length, 2nd pereopod length/ merus length, and 2nd pereopod length/ propodus length. Also, it resembles *Atyaephyra desmaresti desmaresti* and *Atyaephyra desmaresti orientalis* in the indices of total length/ carapace and rostrum length/ carapace length. Moreover, it resembles *palaemon elegans* in the index of abdomen length/ telson length, and resembles *Palaemon pacificus* in the index of 1st pleopod/ endopodite.

From the above mentioned comparisons among different species of shrimps studied including atyid and palaemonid prawns, one can conclude that there is no general rule concerning sexual dimorphism in the meristic and proportional characters studied. These results add a heavy duty to the taxonomists of this group to discover the extent of sexual variations which exist within the species described.

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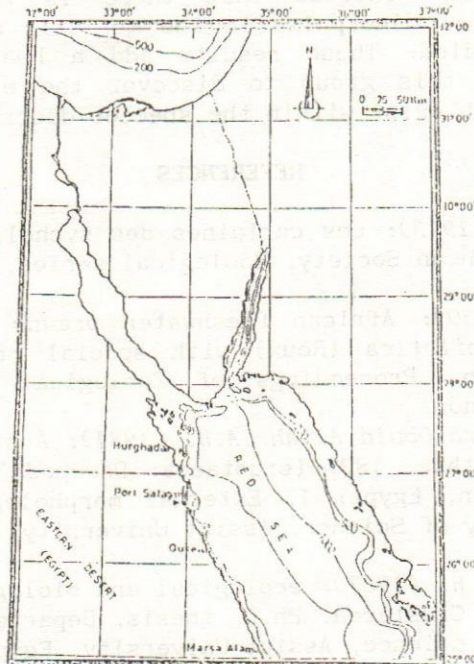


Fig. 1 .A map of the Red Sea, showing the collection site.

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Tab. 1. results of t-test on the differences in some morphometric indices between males and females of *Palaemon* sp.

n	Morphometric index	d. f.	t	p	result
1.	rostrum length/ depth:	78	3.098	0.01-0.001	++
2.	rostrum length/ carapace:	78	4.318	<0.001	++
3.	total length/ rostrum:	78	0.802	0.5-0.4	-
4.	total length/ carapace:	78	4.678	<0.001	++
5.	total length/ abdomen:	78	0.587	0.6-0.5	-
6.	total length/ 1st abdominal segment:	78	1.168	0.3-0.2	-
7.	total length/ telson:	78	2.268	0.5-0.02	+
8.	abdomen length/ carapace:	78	4.057	<0.001	++
9.	abdomen length/ last abdomen segment:	78	0.817	0.5-0.4	-
10.	abdomen length/ telson:	78	2.123	0.05-0.02	+
11.	1st cheliped/ ischium:	78	0.451	0.7-0.6	-
12.	1st cheliped/ merus:	78	2.165	0.05-0.02	+
13.	1st cheliped/ carpus:	78	1.162	0.3-0.2	-
14.	1st cheliped/ propodus:	78	1.610	0.2-0.1	-
15.	1st cheliped/ dactylus:	78	0.091	0.95-0.90	-
16.	2nd cheliped/ ischium:	78	0.400	0.7-0.6	-
17.	2nd cheliped/ merus:	78	2.990	0.01-0.001	++
18.	2nd cheliped/ carpus:	78	0.740	0.5-0.4	-
19.	2nd cheliped/ propodus:	78	3.580	<0.001	++
20.	2nd cheliped/ dactylus:	78	1.005	0.3-0.2	-
21.	1st pleopod length/ basipodite:	78	0.150	0.9-0.8	-
22.	1st pleopod length/ exopodite:	78	0.310	0.8-0.7	-
23.	1st pleopod length/ endopodite:	78	15.30	<0.001	++
24.	2nd pleopod length/ basipodite:	78	1.450	0.2-0.1	-
25.	2nd pleopod length/ exopodite:	78	0.310	0.8-0.7	-
26.	2nd pleopod length/ endopodite:	78	1.261	0.3-0.2	-
27.	3rd pleopod length/ basipodite:	78	1.950	0.10-0.05	-
28.	3rd pleopod length/ exopodite:	78	0.998	0.3-0.4	-
29.	3rd pleopod length/ endopodite:	78	0.560	0.6-0.5	-
30.	4th pleopod length/ basipodite:	78	0.391	0.7-0.6	-
31.	4th pleopod length/ exopodite:	78	0.267	0.8-0.7	-
32.	4th pleopod length/ endopodite:	78	0.990	0.4-0.3	-
33.	5th pleopod length/ basipodite:	78	0.370	0.8-0.7	-
34.	5th pleopod length/ exopodite:	78	0.270	0.8-0.7	-
35.	5th pleopod length/ endopodite:	78	1.610	0.2-0.1	-

d. f. : degree of freedom; +: significant. ++: highly significant,
 - : insignificant.

Tab. 2. Chi-square test on the number of dorsal spines of rostrum and their frequencies in *Palaemon* sp..

Sex	Number of dorsal teeth on rostrum					sum	d.f.	p	result
	4	5	6	7	8				
male	0	6	29	3	2	40	4	0.3-0.5	-
female	1	4	31	4	0	40			

Tab. 3. Chi-square test on pre-orbital teeth of rostrum and their frequencies in *Plaeomon* sp..

Sex	Number of pre-orbital teeth on rostrum					sum	d. f.	p	result
	3	4	5	6	7				
Male	0	5	30	3	2	40	4	0.3-0.5	-
Female	1	3	32	4	0	40			

Tab.4. Chi-square test on the number of post-orbital teeth of rostrum and their frequencies in *Palaemon* sp..

Sex	Number of post-orbital teeth of rostrum		sum	d.f	P	result
	0	1				
Male	1	39	40	1	0.90	-
Female	1	39	40			

Tab.5. Chi-square test on the number of sub-apical teeth of rostrum and their frequencies in *Palaemon* sp..

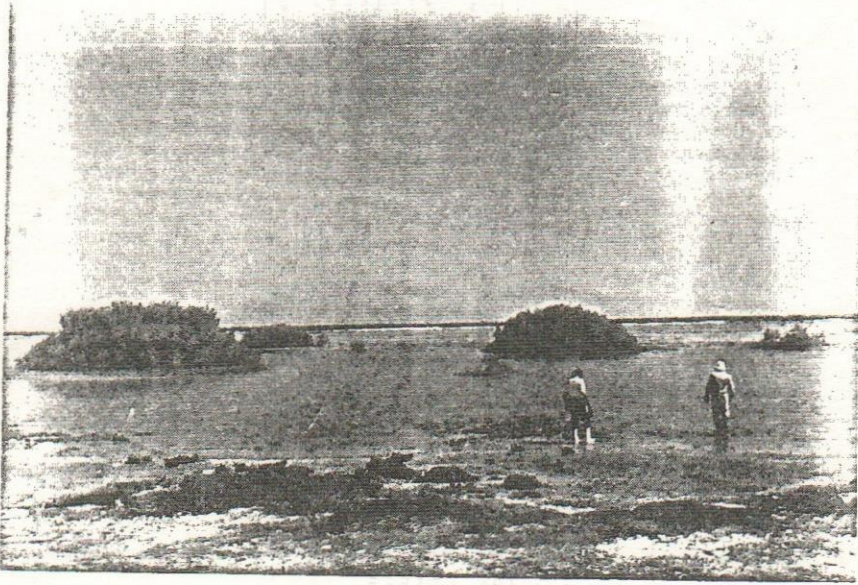
Sex	Number of sub-apical teeth of rostrum			sum	d.f	p	result
	1	2	0				
Male	39	2	0	41	2	0.3-0.2	-
Female	39	0	1	40			

Tab. 6. Chi-square test on the number of ventral teeth of rostrum and their frequencies in *Palaemon* sp..

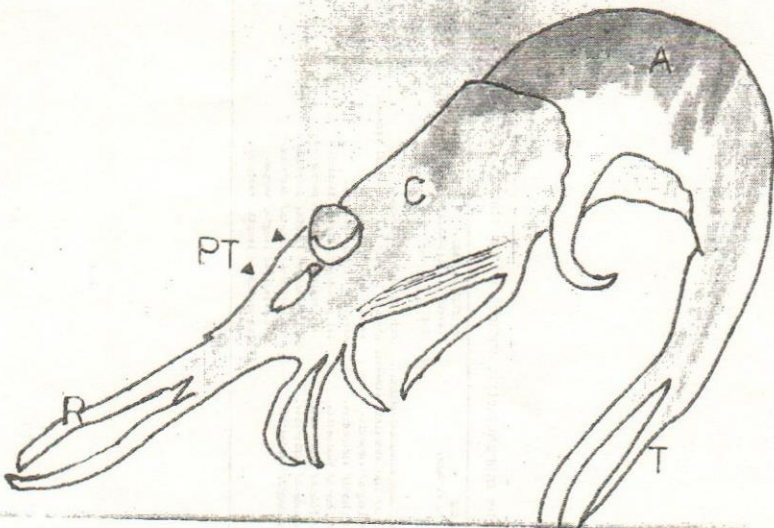
Sex	Number of ventral teeth on rostrum						sum	d.f.	p	result
	3	4	5	6	7	8				
male	1	2	3	20	12	2	40	5	0.2-0.1	-
female	0	0	0	19	18	3	40			

Table 7. The morphometric indices which show significant differences between males and females in some studied shrimps.

Female indices Omud-dalal & Abu el Dabal (1974)	Female indices Bussan & Omud-dalal (1974)	Alwarshin semi-river shrimp Omud-dalal (1987)	Alwarshin semi-river shrimp Omud-dalal (1987)	Female indices Omud-dalal & Abu el Dabal (1974)
1. total length/ last abdominal segment.	1. total length/ carapace	total length/ carapace	total length/ carapace	1. total length/ carapace
2. abdomen length/ last abdominal segment.	2. abdomen length/ last abdominal segment.	2. abdomen length/ last abdominal segment.	2. abdomen length/ last abdominal segment.	2. abdomen length/ last abdominal segment.
3. 1st pleopod length/ endopodite.	3. 1st pleopod length/ rostrum.	3. 1st pleopod length/ carapace.	3. 1st pleopod length/ carapace.	3. 1st pleopod length/ carapace.
4. 1st pleopod length/ endopodite.	4. 1st pleopod length/ rostrum.	4. 1st pleopod length/ carapace.	4. 1st pleopod length/ carapace.	4. 1st pleopod length/ carapace.
5. 2nd pleopod length/ endopodite.	5. 2nd pleopod length/ rostrum.	5. 2nd pleopod length/ carapace.	5. 2nd pleopod length/ carapace.	5. 2nd pleopod length/ carapace.
6. 2nd pleopod length/ endopodite.	6. 2nd pleopod length/ rostrum.	6. 2nd pleopod length/ carapace.	6. 2nd pleopod length/ carapace.	6. 2nd pleopod length/ carapace.
7. 5th pleopod length/ endopodite.	7. 5th pleopod length/ rostrum.	7. 5th pleopod length/ carapace.	7. 5th pleopod length/ carapace.	7. 5th pleopod length/ carapace.
8. 5th pleopod length/ endopodite.	8. 5th pleopod length/ rostrum.	8. 5th pleopod length/ carapace.	8. 5th pleopod length/ carapace.	8. 5th pleopod length/ carapace.

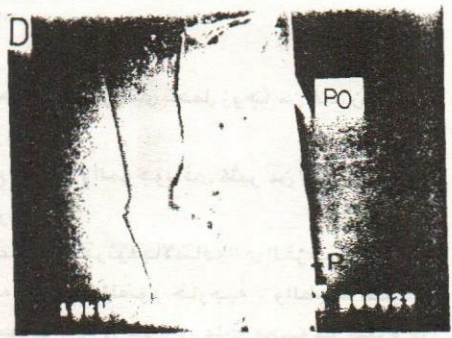
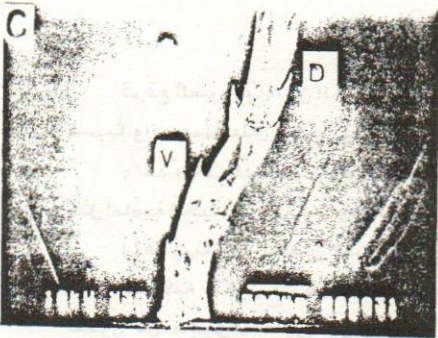
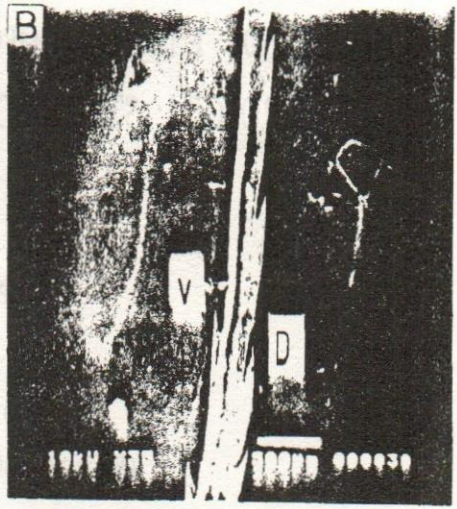
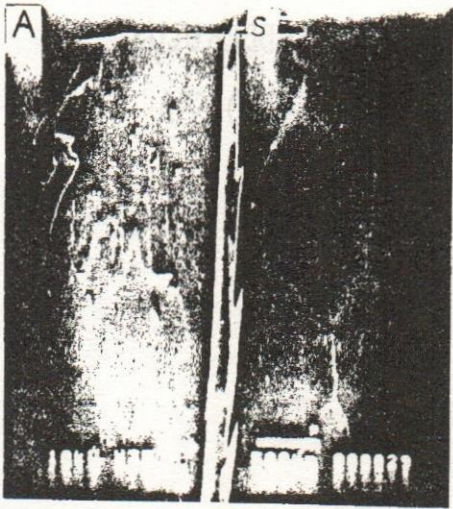


Pl. 1A: Photograph of the collection site on the Red Sea showing mangrove plants from which samples were collected.



Pl. 1B: Photograph for *P. sp.* showing its external features. A=Abdomen; C=Carapace; PT=pre-orbital teeth; R= Rostrum; T=Telson.

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PL. 2: Scanning electron micrograph for the rostrum (A-D), showing different types of rostral teeth. P=pre-orbital teeth; PO=post-orbital teeth; D=dorsal teeth; V=ventral teeth; S=sub-apical teeth.

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ON EYE OF THE GASTROPOD STROMBUS GIBBERULUS
(GASTROPODA: STROMBIDAE) FROM THE RED SEA

(With 2 Plate)

By

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عين القواقع سترومبس فبريلس / قواقع: سترومبيدى
من البحر الاحمر

حسنى أبو الصهب

قوقع السرومباك من القواقع التى تكثر فى البحر الاحمر والتى تحمل زوجاً من الاعين الكبيره نسبياً والمحملة على ساقين وتستخدم فى رؤية الفريسه .
ولقد بينت الدراسه ان عين هذا القوقع من النوع المغلق والموجود فى كثير من القواقع الاخرى مثل امامية الخياشيم الاخرى ، خلفية الخياشيم ، والرئويات .
ولقد بينت الدراسه أن العين تتكون من شبكيه وعدسه ، وقرنيه بالاضافه الى القرنيه .
الشبكيه تتكون من طبقه صبغيه داخلية وطبقه حساسه للضوء خارجيه . والطبقه الصبغيه تتكون من مجموعه كبيره من الخلايا الصبغيه السوداء والتى تحتوى على مجموعه كبيره من الصبغيات وأما الطبقة الحساسه للضوء تتميز الى نوعين من الخلايا مغزليه وبيضاويه تخرج منها أعصاب تتجمع لتعطى العصب البصرى .
ولقد وجد أن العدسه كبيرة الحجم نسبياً وتتميز الى طبقه مركزيه واخرى محيطيه . هذا القوقع يستخدم العينين لرؤية الاعداء والفرائس لانقضاء عليها اما بغرض الدفاع أو التغذيه .