

The intertidal Decapods of Bushehr, northern part of the Persian Gulf

Hosseini S.H.

Iranian Fisheries Research Organization P.O Box: 14155-6116 Tehran, Iran

Received: May 2007

Accepted: December 2008

Abstract

This work was carried out to identify decapods of the Bushehr intertidal zone, northern coast of the Persian Gulf. Specimens were collected from eight stations along the coast. During this survey, twelve species were identified, including one alpheid shrimp (*Alpheus lobidens*), three Anomura (*Petrolisthes rufescens*, *Porcellana persica*, *Clibanarius signatus*) and eight Brachyura (*Portunus pelagicus*, *P. sanguinolentus*, *Eurycarcinus orientalis*, *Metopograpsus messor*, *Leptodius exaratus*, *Pilumnopus vauquelini*, *Carpilus convexus* and *Ocypode rotundata*).

Keywords: Anomura, Brachyura, Alpheid, Bushehr, Persian Gulf, Iran

Introduction

The crustaceans of the Persian Gulf have partially been investigated and a few relevant surveys of coastal regions in vicinity have been carried out (Stephensen, 1945; Guinot, 1964; Haig, 1966; Holthuis, 1977, Lewinsohn, 1977; Titgen, 1982; Jones, 1986; Apel, 1994, 2001; Cooper, 1997; De Grave, 2007; Naderloo & Sari, 2007).

Most of the present information about the Western Indian Ocean and the Persian Gulf decapods is derived from research cruises, such as those involved in the

International Indian Ocean Expedition, 1963–1964 (Haig, 1966). However their data were inaccessible. Intertidal collections were few and not many of the sampling area such as the Persian Gulf have been studied reasonably and intensively. Therefore, the main objectives of the present study were to study the decapod fauna of the area and to compare these data with decapods of the adjacent waters.

Materials and methods

Eight stations (28° 54' 11.90" N and 50° 56' 27.54" E) were selected in Bushehr intertidal zone, based on different substrata and possible changes in future (Fig. 1):

Station 1 & 2 in Jofreh (Jof), former being sandy sewage polluted and the latter being eroded coral reef with crevices and covered with chlorophytae (*Ulva*);

Station 3: Jalali (Jal) – dead coral reef with polluted muddy sediment (oil pollution);

Station 4: Khajeha (Kha)–dead coral covered with algae;

Station 5: Sar-e-tol (Sar)–sandy an in some places with loose bedrock and no vegetation;

Station 6: Helileh (Hel)–sandy beach partially polluted with sewage;

Station 7: Bandargah (Ban) – this shore consists of jumble of boulders, small stones, loose bedrock and sometimes coarse sand;

Station 8: Abasak (Aba) – Sandy beach;

All samples were taken during low tide, using different gears like trap and hand net. Sampling was carried out at each station during autumn 1993, winter and spring 1994. Specimens were preserved in 10% seawater formalin solution. Some specimens were sent to the National Natuurhistorisch Museum of Leiden, the Netherland for confirmation of the preliminary identification.

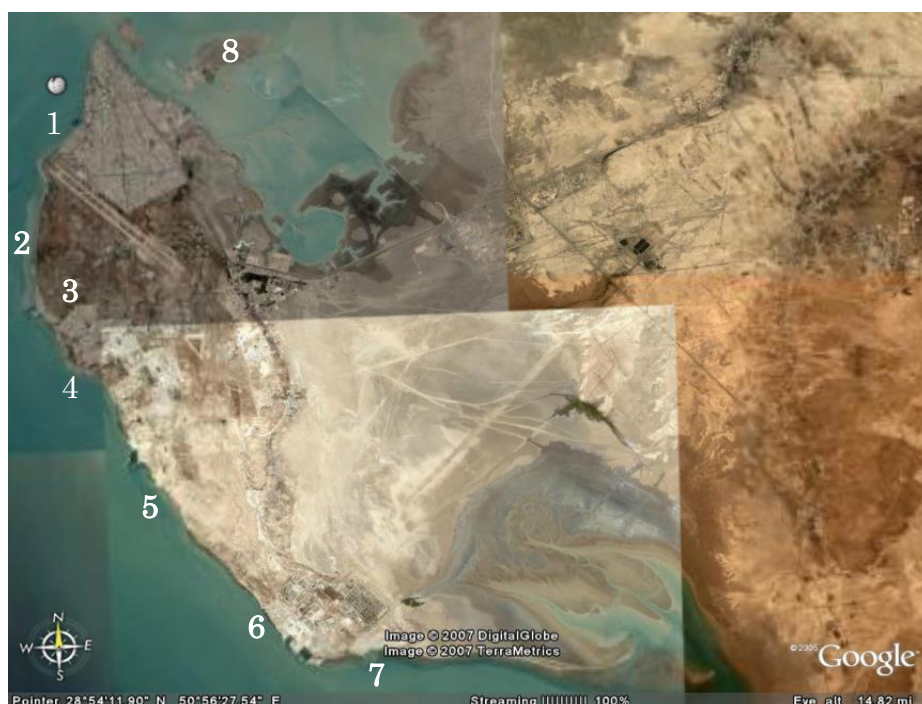


Figure 1: Sampling sites in Bushehr area

Results

Twelve species from nine decapod families including Alpheidae, Porcellanidae, Diogenidae (Anomura), Xanthidae, Portunidae, Grapsidae, Pilumnidae, Ocypodidae and Carpiliidae (Brachyura) were observed (Table 1).

Table 1: List of crabs and shrimps in the present study; for abbreviation on station see material and methods (+: present; -: absent)

Species		Stations	Jof 1	Jof 2	Jel	Khe	Sar	Hel	Ban	Aba
Infra- order Brachyura	Family Xanthidae :									
	<i>Leptodius exaratus</i> (Milne Edwards 1834)		-	+	+	+	-	-	-	-
	<i>Pilumnopeus vauquelini</i> (Audouin 1826)		-	+	+	+	-	-	-	-
	Family Portunidae:									
	<i>Portunus pelagicus</i> (Linnaeus 1758)		-	-	-	-	-	+	+	+
	<i>Portunus sanguinolentus</i> (Herbest 1783)		-	-	-	-	-	+	+	+
	Family Grapsidae									
	<i>Metopograpsus messor</i> (Forskal 1775)		+	-	-	-	-	-	+	+
	Family Ocypodidae:									
	<i>Ocypode rotundata</i> (Mier 1882)		-	-	-	-	-	-	-	+
Infra- order Anomura	Family Carpiliidae:									
	<i>Carpilus convexus</i> (Milne Edwards 1833)		-	+	+	+	-	-	-	-
	Family Pilumnidae:									
	<i>Eurycarcinus orientalis</i> (Milne Edwards 1867)		-	-	-	+	+	+	-	-
	Family Diogenidae:									
	<i>Clibanarius signatus</i> (Heller 1861)		+	-	-	-	+	+	+	+
	Family Porcellanidae:									
	<i>Petrolisthes rufescens</i> (Heller 1861)		-	-	+	+	-	+	+	-
	<i>Porcellana persica</i> (Haig 1966)		-	-	-	-	+	+	-	-
	Caridea									
Family Alpheidae:										
<i>Alpheus lobidens</i> (De Haan 1849)		-	-	+	-	-	-	+	-	

Discussion

Decapoda constitutes the largest and most diverse order of Malacostraca. In this study twelve species of intertidal decapods of Bushehr were identified, namely one alpheid, three crab-like species (Anomura) and eight true crabs (Brachyura) species. All of these species occur in the Western Indian Ocean, generally in the north-western part. Decapoda of the Indo–West Pacific (IWP) consists of 209 species (Titgen, 1982). The result on Alpheids, Anomura and Brachyura from this survey and their comparison with the other works in this region gives a picture of intertidal decapoda situation of the area. The geographical range of decapod crustaceans recorded in this course of Bushehr intertidal survey is very wide. Clearly most species are widely distributed throughout the Western Indian Ocean.

The true crabs (Brachyura) of intertidal zone of Bushehr recorded in this survey belong to six families, namely Xanthidae, Portunidae, Grapsidae, Ocypodidae, Pilumnidae, and Carpillidae. The brachyuran fauna of the Persian Gulf in terms of species number is comparable with the adjacent waters in the Indian Ocean. More than one fifth of Portunidae diversity (22%) and Xanthidae (21%) of the West Indian Ocean occur in the Persian Gulf. In one of the earliest work in the Persian Gulf area, Stephensen (1945) recorded 163 species of marine Brachyura in Iran. Apel (2001) collected some specimens of crabs on the Arabian side of the Persian Gulf, revised previously collected material and subsequently

presented a total of 200 species of crabs for the Persian Gulf. The work of Apel (2001) is the last key reference for the Persian Gulf crabs.

Only two Xanthidae species were recorded from Bushehr intertidal zone. According to Titgen (1982), 262 species of Xanthidae were recorded from the western Indian Ocean, 56 of them from Persian Gulf. These crabs, some of which are algae dependent, are commonly found in dead coral, hence called coral crabs. Two xanthid coral crabs (*Leptodius exaratus* and *Pilumnopus vauquelini*); one pillmunid (*Eurycarcinus orientalis*) and one swimming crab (*Portunus pelagicus*) were reported as mangal associated species by Apel (1994).

One dead coral crab of Bushehr intertidal zone is *Leptodius exaratus* (Table 1) (Fig. 2), which is a common and wide ranging Indo–West Pacific crab). Titgen (1982) reported this crab from the rocky intertidal beach of Dubai, generally under rocks and in holes. This crab was not recorded by Jones (1986) in Kuwait. In this survey, it seems the color in the intertidal xanthid crab to be related to the nature of dead coral substrate.

Another of the xanthid crabs of intertidal coral of Bushehr is *Pilumnopus vauquelini* (Table 1) (Fig. 3), which has also been reported from Kuwait (Jones, 1986) and UAE mangrove zone (Cooper, 1997).

Of the portunid crab, two species, viz blue swimming crab (*Portunus pelagicus*) (Table 1) (Fig. 4) and red spot swimming crab (*P. sanguinolentus*) (Table 1) (Fig. 5) were collected from Helileh, Bandargah and Abasak.

These species have reportedly found with a wide range of distribution in inshore and continental shelf area including sandy, muddy or algal and sea grasses habitat from intertidal zone to depths 30-50m or more (Williams, 1982; Edgar, 1990). *P. sanguinolentus* has, however, not been reported in earlier reports from Dubai (Titgen, 1982) and Kuwait (Jones, 1986). Totally, 37 portunid species have been reported from the Persian Gulf (Apel & Spridinov, 1998).

Red coral crab *Carpilus convexus* (Table 1) (Fig. 6) is the largest one that has heavy armor and strong claws and the male of which carries garish eye-like spots on its back while the female is more or less plain red. It was neither recorded by Titgen (1982) from Dubai and nor by Jones (1986) from Kuwait.

Bushehr specimens of shore crab (*Metopograpsus messor*) with different sizes and colors collected specially from Sartol (Table 1) (Fig. 7). This ubiquitous specimen, usually found in hard substrate of the intertidal zone, has also been reported from Dubai (Titgen, 1982; Cooper, 1997), Kuwait (Jones, 1986) as well as hard substrates of the Saudi Arabian coast along the Persian Gulf (Basson *et al.*, 1977). Being generally known as rock crab, *M. messor*, has also reportedly been abundantly found in mangal community (Cooper, 1997) and other habitats (Apel, 1994). Apel (2001) provides a key to species of the genus *Metopograpsus*. Compared to the Red Sea, Persian Gulf has fewer coral reefs and softer bottom habitats. Of 49 Grapsidae species recorded from West Indian Ocean,

there exist only 16 species in Persian Gulf (Titgen, 1982).

In the present study, only one species of Pillmunidae, namely *Eurycarcinus orientalis* (Table 1) (Fig. 8) was found in muddy and sandy bed of Bushehr. This species is limited to West Indo Pacific. *E. orientalis* has also been reported from Saudi Arabia (Basson *et al.*, 1977) and collected from Kuwait (Jones, 1986) and from Bahrain (Apel, 1994) and from the north-eastern coastal islands of Abu Dhabi (Cooper, 1997) and Dubai (Titgen, 1982).

Diogenidae family was one of Anomuran that was studied in this survey. Bushehr specimens were collected from intertidal zone along the shore of Bandargah. Hermit crab, *Clibanarius signatus* (Table 1) (Fig. 9) is restricted to north-western Indian Ocean. About 39 species of *Clibanarius* sp. Distributed in the world. Porcelain crab often lives in pairs of male and female. These were found in the empty shells. This was collected intertidally in Dubai and shallow sub tidally along rocky beach (Titgen, 1982).

Of the Anomura, only two species of porcelain crab and one hermit crab were found in the present study. Anomura (Porcellanidae and Paguridae) appear slightly more parochial than the remainder of the decapods, but more than half of the anomuran species are found widely in the western Indian Ocean. Thirteen species were identified from the Dhofar (Hogarth, 1984). Further studies of porcellanid by Haig (1966) indicate 15 species from Persian Gulf and Gulf of Oman. *Porcellana*

persica (Table 1), is reported for the first time from the Persian Gulf and Gulf of Oman. Titgen (1982) recorded 12 species of porcellanid from Dubai, including *Petrolisthes rufescens* (Table 1) (Fig. 10). *P. rufescens* appears to be restricted to the Indian Ocean (Haig, 1966; Lewinsohn, 1977). Six species are limited to the Western Indian Ocean. *P. rufescens* was collected by Jones (1986) from Kuwait, but *P. persica* was not found in their examined material. It seems *Porcellana persica* is one of the Indo–West Pacific species.

Alpheid shrimp *Alpheus lobidens* (Table 1) (Fig. 11) was found in the cold months from under stone in Bandargah. There are 128 species of snapping shrimp belonging to the genus *Alpheus* in Indo–Pacific and 66 species in the rest of the world (Abele, 1982). Ten of the twelve species of *Alpheus* reported from the Persian Gulf are mentioned in Banner and Banner (1982). New records added eight species to total number of caridean, raised total species of the Persian Gulf to 46 (De Grave, 2007).

A ghost crab, *Ocypode rotundata* was identified in our work (Table 1). This species, which is reportedly confined to the Persian

Gulf (Turkay *et al.*, 1996), and western Pakistan (Yousuf *et al.*, 2007), and have a wide distribution in the area (Turkay *et al.*, 1996). This species is reportedly similar to *O. saratan*, reported from Kuwait (Jones, 1986), that make their differentiation very difficult. In general, *Ocypode* is a numerous genus with a worldwide distribution in tropical and subtropical coasts. Six species of Ocypodidae have already been recorded from the Persian Gulf, the largest number of which belongs to *Ocypode rotundata* (Titgen, 1982).

Based on the results of the present study, species composition of the intertidal decapod fauna of the Bushehr zone is more influenced by its dead coral habitat type.

In total, 12 species including 1 alpheid shrimp (Alpheidae) 2 Porcellanidae and 1 Diagonidae (Anomura), 2 Xanthidae, 2 Portunidae, 1 Grapsidae, 1 Pilumnidae, 1 Ocypodidae, 1 Carpiliidae (Brachyura) were found in this survey. It seems that most species show affinity to East Indian and west Pacific Ocean decapods. Only one of them, namely (*P. persica*), is endemic to the north part of the Persian Gulf and Oman Sea.



Figure 2: *Leptodius exaratus* Length, 30mm



Figure 3: *Pilumnopus vauquelini* Length, 50mm



Figure 4: *Portunus pelagicus* Length, 180mm



Figure 5: *Portunus sanguinolentus* Length, 170mm



Figure 6: *Carpilus convexus* Length, 50mm



Figure 7: *Metopograpsus messor* Length, 170mm



Figure 8: *Eurycarcinus orientalis* Length, 48mm



Figure 9: *Clibanarius signatus* Length, 6mm



Figure 10: *Petrolisthes rufescens* Length, 22mm



Figure 11: *Alpheus lobidens* Length, 45mm

Acknowledgement

I would like to thank all my colleagues in the Persian Gulf and Oman Sea Fisheries Research Center. Also, I would like to express my appreciation and thanks to Dr. L.B. Holthouis for identification of material.

References

- Abele, L.G., 1982.** Biology of Crustacea (Vol.1 Systematics, the fossil record, and Biogeography). State University of Florida, Academic Press. USA. 119P.
- Apel, M., 1994.** Biology, ecology and taxonomy of the brachyuran and paguridean crustacean. *In:* E. Feltkamp and F. Krupp (eds). Establishment of marine habitat and wildlife sanctuary of the Gulf region. Final reports for phase. pp.406–437.
- Apel, M., 2001.** Taxonomy and zoogeography of the Brachyura, Paguridea, and Porcellanidae (Crustacean: Decapoda) of the Persian Gulf. Dissertation zur Erlangung des Doktorgrades der Naturwissenschaften (Ph.D. dissertation), Johann Wolfgang Goethe University, Frankfurt Germany. (In German).
- Apel, M. and Spiridonov, V.A., 1998.** Taxonomy and zoogeography of the portunid crabs (Crustacean: Decapoda: Brachyuran: Portunidea) of the Persian Gulf and adjacent waters. *Fauna of Saudi Arabia*. **17**:159-331.
- Banner, D.M. and Banner, A.H., 1982.** The Alpheid shrimp of Australia. Part I. the remaining alpheids, principally the genus *Alpheus*, and family Ogrididae. *Records of the Australian Museum*. **34(1)**:1-357.
- Basson, P.W., Buchard, J.E., Hardy, J.T. and Price, A.R.G., 1977.** Biotopes of the western Persian Gulf. Marine life environments of Saudi Arabia. Aramco department of loss prevention and Environmental affairs. Dhahran, Saudi Arabia. 284P.
- Cooper, R.T., 1997.** Mangal-associated Brachyura (Ocypodidae, Grapsidae, Portunidae, Majidae, Xanthidae and Leucosiidae) from the north-eastern coastal islands of Abu Dubai, United Arab Emirates, *Crustaceana*. **70(2)**:155-179.

- De Grave, S., 2007.** Note on some shrimp species (Decapoda: Caridea) from the Persian Gulf. *Naturehistorisches Museum, Wien*. **108B**:145-152.
- Edgar, G.J., 1990.** Predatory prey interaction in sea grass beds. Distribution and diet of blue Manna crab (*P. pelagicus* Linnaeus) at cliff Head. *Western Australia Journal of Experimental Biology and Ecology*. 139P.
- Guinot, V.D., 1964.** Crustacean, Decapods, Brachyuran, (Xanthidae) des compagens de la calypso en mer Rouge (1952), dans le Golfe Presque et al l'île Aldabra 1954. *Memoires du Musee National d' Histoire Naturelle, Nouvelle Serie, Ser. A, Zoologie*. **32**:1-108.
- Haig, J., 1966.** The Porcellanidea (Crustacea: Anomura) of the Iranian Gulf and Gulf of Oman. *Videnskabelige Meddelser fra Dansk Naturhistorisk Forening i Kjobenhavn*. **129**:49-65.
- Heller, C., 1861.** Beitrage zur crustaceen-fauna des Roithen Meeres. Zweiter Theil. *Sitzungsberichte der mathematisch-naturwissenschaftlichen classe der kaiserlichen akademie der wissenschaften, Wien*. **44(1)**:241-295.
- Hogarth, P.J., 1984.** The marine crustaceae of Dhofar, Southern of Oman. *Journal of Oman Studies*. **10(B)**:99-124.
- Holthouis, L.B., 1977.** The Grapsidae, Gecarcinidae and Palacidae (Curstacea: Decapoda: Brachyura) of the Red Sea. *Israel Journal of Zoology*. **26**:141-192.
- Jones, D., 1986.** A field guide to the seashore of Kuwait and Persian Gulf. University of Kuwait. pp.1-192.
- Lewinsohn, C.H., 1977.** Die Osypodidae des Roten Meeres (Crustacea: Decapoda, Brachyura). *Zoologische Verhandelingen, Leiden*. **152**:44-84.
- Naderloo, R. and Sari, A., 2007.** Subtidal crabs of the Iranian coast of the Persian Gulf. New collection and biogeography considerations. *Aquatic Ecosystem Health & Management*. **10(3)**:341-349.
- Stephensen, K., 1945.** The Brachyura of the Iranian Gulf. *In: K. Jessen and R. Sparck (eds.). Danish Scientific Investigations in Iran. Einar Munksgaard, Copenhagen, Holland*. **4**:57-237.
- Titgen, R.G., 1982.** The systematic and biology of decapods of Dubai and zoogeographic relationship to Persian Gulf and Western Indian Ocean (PhD thesis, Texas A & M University). 292P.
- Turkay, M., Sakai, K. and Apel, M., 1996.** The *Ocypode* ghost crabs (Crustacea : Decapoda: Brachyura) of the Arabian Peninsula and Adjacent Regions. *Fauna of Saudi Arabia*. pp.99-117.
- Williams, M.Y., 1982.** Natural food and feeding in the commercial sand crab (*P. pelagicus* Linnaeus 1766) (Crustacean: Decapod: Portunidae) in Moreton Bay. *Queensland Journal of Experimental Marine Biology and Ecology*. pp.165-176.
- Yousuf, F., Ali, F. and Kazmi, B.Q., 2007** Some ghost crabs of the genus *ocypode* (Decapod: Brachyura: Ocypodidae) from Pakistan's waters (northern Arabian Sea) *Turkish Journal of Zoology*. **31**:107-112.