Population structure of green tiger prawn, *Penaeus semisulcatus* (De Haan) in Bushehr waters, Persian Gulf

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Information on the population genetics of shrimp species in the Persian Gulf is scarce. There are few electrophoretic based study therefore the aim of the present study was to investigate genetic variation among population of the green tiger prawn, *P. semisulcatus*, in Bushehr waters, Persian Gulf (Rezvani *et al*., 2001 and Rezvani, 2002) . This is the first study on this species by RAPDs in this area. The input of research in the field of genetics has resulted in new technological advances that have improved the economic gains of shrimp production.

A total of 50 *P. semisulcatus* were collected by R/V Lavar II from two major shrimp localities, Halaileh and Daylam (Fig. 1), in August and September 2004. Genomic DNA was extracted from muscles using the modified mini preparation method (Lie *et al*., 1999). A set of 9 primers (Diotech MWG) were used to detect polymorphism among populations (Table 1). The software package RAPDistance (Armstrong *et al*., 1994) version 1.04 was used to analyse the data.

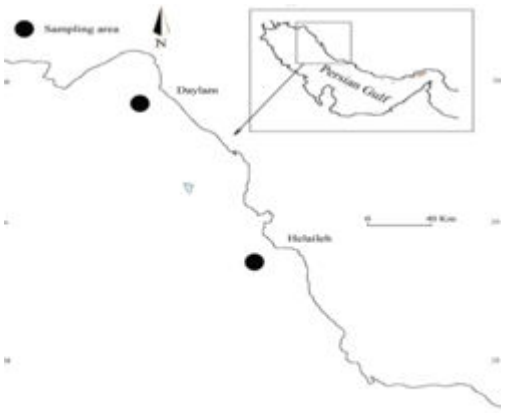


Figure 1: Sampling areas for *P. semisulcatus* in Bushehr coastal waters, Persian Gulf (2004)

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RAPDs analysis using the 9 primers which were polymorphic to some degree (Table 2).

An example of RAPDs gel obtained during the study is shown in Figure 2. Of the 9 primers examined, the percentage of polymorphism was 14.8% and most of the primers were monomorphic (85.2%).

Table 1: Sequence and operon codes of the OPA primers used for *P. semisulcatus* in the Bushehr waters, Persian Gulf (2004-2005)

Primer codes	Sequences (5 to 3)
OPA-01	CGTCTCCTAG
OPA-04	CGGAGAGCGA
OPA-09	TGGGCTCGCT
OPA-10	CCGGCATAGA
OPA-15	ACTTGTGCGG
OPA-17	CCCACTGACG
OPA-18	CTGAGGAGTG
OPA-19	GGTCAACCCT
OPA-20	GCGGGAGACC

Table 2: Number of amplicons and the number of polymorphic bands produced by each RAPD primer for populations of *P. semisulcatus* in the Bushehr waters, Persian Gulf (2004-2005)

Primers	Number of amplicons	Polymorphic amplicons	Percentage of polymorphism%
OPA-01	3	0	0
OPA-04	4	0	0
OPA-09	3	1	33.3
OPA-10	4	0	0
OPA-15	4	0	0
OPA-17	3	0	0
OPA-18	4	2	50
OPA-19	4	0	0
OPA-20	8	4	50
9 Primers	37	7	14.8

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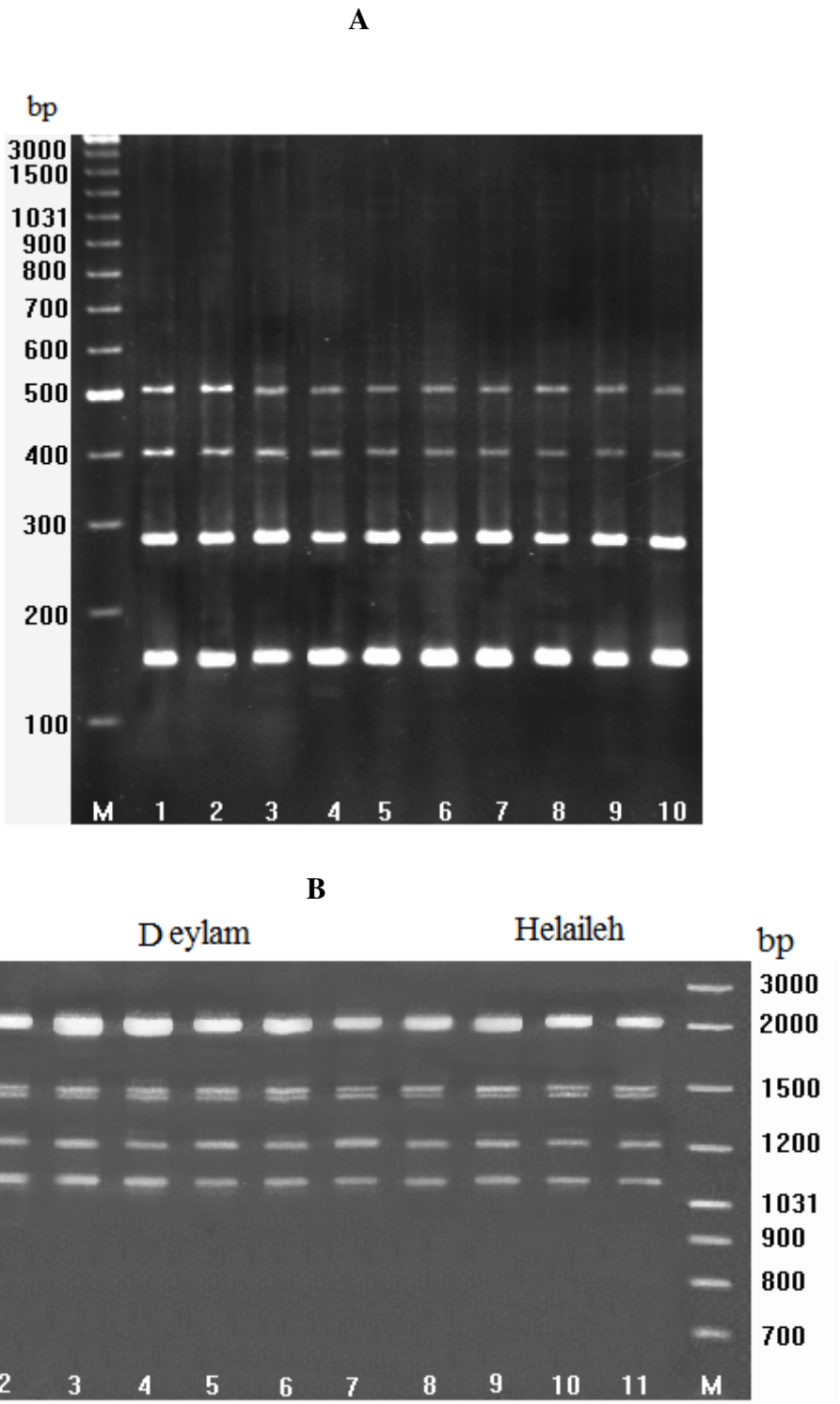


Figure 2: PCR generated amplicones by primers OPA-04 (A) and OPA-09 (B) for *P. semisulcatus* population in Bushehr waters, Persian Gulf (2004). Column M is the marker. In OPA-04 lanes 1-6 Daylam and lanes 7-10 Helaileh areas and in OPA-09, lanes 1-5 Daylam and lanes 6-11 Helaileh aeas. OPA-09 showed one polymorphisms arrow.

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In the present study, the statistical analysis, indicating that *P. semisulcatus* populations around Bushehr area not well structured and also the small percentage of polymorphism indicated a very week genetic integrity among populations. The previous PCR-RFLP analysis (Rezvani *et al*., 2001; Rezvani, 2002) also failed to detect any significant difference among populations of *P. semisulcatus* in this region. Strong genetic differentiation in Indian Ocean populations from those found in the Pacific and South-east Asia have been reported for several marine fishes and invertebrates (Benzie, 1999), including *P. monodon* (Klinbunga *et al*., 1998; Duda and Palumbi, 1999; Benzie, 2000). In these studies although some species appeared to show no variation over large geographical distances (thousands of kilometeres), but some showed differentiation over much smaller distances in parts of their range (hundreds kilometers). In the Iranian waters (Persian Gulf), a program has recently been made since 2003 for releasing of green tiger prawn to the Bushehr waters. These prawns are generally reared from a limited number of parents and this program may effect on the genetic structure of this species in the Bushehr waters in the future.

further samples will need to be obtained from populations between Iranian waters and Arabian side in the Persian Gulf to determine whether there are any differentiations in different region and these differentiations have a biogeographically component and in addition to that accounted for by isolation by distance. The present study recommends that the population management plan of the wild *P. semisulcatus,* if possible be executed at every local area in the Persian Gulf.

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