TLS
Trends in Life Sciences
An International Peer-Reviewed Journal
www.sciencejournal.in

BIODIVERSITY OF FIDDLER CRABS IN MUMBAI REGION

Mangale V. Y. and Kulkarni B. G**
*Mahatma Phule Arts, Science and Commerce College, Panvel (M.S.) India
**The Institute of Science, 15, Madam Cama Road, Mumbai (M.S.) India
(E mail: vilas_mangale1957@yahoo.co.in)

ABSTRACT
A survey of intertidal areas Mumbai region was undertaken to assess Biodiversity of fiddler crabs. Three species of fiddler crabs namely *Uca annulipes*, *U. vocans* and *U. dussumieri* were recorded from intertidal areas of Malad, Mudh Jetty, Vikroli, Sewri, Vashi, Nerul, Panvel and Karanja Mumbai region. Among the three species *Uca annulipes* found abundantly at all the sites throughout the period of investigation. Results of the present investigation indicate that the distribution of *Uca vocans* and *Uca dussumieri* is under pressure of human influence on specific habitat of these crabs.

KEY WORDS: Biodiversity, fiddler crabs, Mumbai region.

INTRODUCTION

Biodiversity is one potential measure of ecosystem health, and a measure of biological interactions such as competition, disturbance, facilitation, predation, recruitment, and productivity of a system. On a larger scale, biodiversity measurements can serve as an indicator of the balance between speciation and extinction. Inventorying and monitoring biodiversity are crucial task for identifying and clarifying activities that impact ecosystems. Fiddler crabs live in the "intertidal zones" of sheltered bays and estuaries throughout the warmer parts of the world. The genus *Uca* is distributed in tropics, subtropics and the warm temperate zone. Most *Uca* species live in warm climates along the sandy and marshy mudflats of intertidal area. The general habitat of *Uca* lies in the tropics, somewhere near the mouth of stream carrying the domestic sewage and wastewater. In brief, fiddler crabs may be viewed as animals living in environmental borderlands. However, proper attention has not been focused on *Uca* species present on Indian coast. Barring reports on physiology of *Uca* species (Nagabhushnum, 1964, 1968; Nagabhushnum *et. al.*, 1968), comprehensive reports on biology of *Uca* species are not available. Similarly reports on diversity of the fiddler crabs on Indian coast are limited Chakraborty *et. al.*, (1985), Bairagi *et. al.*, (1988). Further, except report of Chhapgar on the 'Marine crabs of Bombay state', diversity of *Uca* species in and around shores of Mumbai has not been accessed since then (Chhapgar, 1957, 1958).

Fiddler crabs have been used as test animals in toxicological studies. It has been shown that fiddler crabs are the best indicators of pollution in intertidal zones Krebs *et. al.*, (1977) and Burger *et. al.*, (1991). Today shore area in and around Mumbai is under pressure of human activities. As a result of heavy anthropogenic pressure, habitat destruction of animals like fiddler crabs in an intertidal ecosystem has been reported Jaiswar, (1999). In light of these observations, the present work on "Intertidal diversity with special reference to fiddler crabs in and around Mumbai (Bombay-west coast of India)" has been undertaken to update the diversity of fiddler crabs.

MATERIALS AND METHODS

A preliminary survey of entire coastal line in and around Mumbai was conducted to study distribution of different species of fiddler crabs and for selection of suitable sites. After careful location of the fiddler crabs particular shore sites like Mudh jetty of Marvey, Sewri jetty, Malad and Vikroli shore, Marshy areas of Thane creek spread at Vashi, Nerul, Panvel and Karanja creek located near Mumbai were selected for assessing diversity of fiddler crabs (Rosenberg, 2001).

RESULTS AND DISCUSSION

During present investigation, three species of fiddler crabs viz. *Uca annulipes*, *Uca vocans* and *Uca dussumieri* were recorded from the intertidal areas in and around Mumbai. In Table 1 shows the iversity of fiddler crab in Mumbai region. It was observed that, *Uca annulipes* were more abundant on upper littoral part of loamy shore where it was easy for *U. annulipes* to make burrows. *Uca vocans* were mostly collected from lower littoral zone where percentage of muddy substratum was more. *Uca dussumieri* solely found to inhabit completely muddy soil present at the lowest part of littoral zone. It was noted that all the three species inhabit the area where the substratum is stable enough to construct

the burrows which remain intact against the tidal force. Further, presence of sewage water was found to be added factor for abundance of the fiddler crab.

Abundance of *U.* annulipes was recorded at all the sites selected for collection of fiddler crabs. A size variation of *U. annulipes* was also observed at different sites. At Mudh jetty, Vashi and Nerul shore areas, large sized *U. annulipes* (10.2 mm length) were collected throughout the investigation period whereas, at Malad and Karanja shore areas, size of *U. annulipes* was small (7.5 mm length). Since food availability in the form of sewage and human excreta was more at Mudh jetty, Vashi and Nerul shore areas, large sized *U. annulipes* were dominating in these areas.

Along the Mudh jetty of Marvey shore both the species i.e. *U. annulipes* and *U. vocans* found to co-exist. Among all the three species, *U. annulipes* was most abundant and found to distribute all over the shores of selected sites with density ranging from 40 to 65 /m^2. The distribution of *U. vocans* found with lower density range of 5 to18 / m^2 at certain selected sites. Since upper littoral part of Malad shore found to be dry and made up of pebbles of different sizes, only one species i.e. *U. annulipes* was recorded from this site. In comparison with other selected sites of Mumbai shores i.e. Nerul, Vashi and Mudh jetty, density of *U. annulipes* was less i. e. 10 to 20 /m^2 at Malad sea shore. Presence of mangrove at intertidal areas in and around Mumbai found to be helpful for habitat of the fiddler crabs. At Vikroli shore, a dense cover of mangrove is present and this mangrove is protected therefore no human interference found in this area. As a result of protection and mangrove cover, *U. vocans* and *U. dussumieri* which needs muddier substratum were found at this site.

At upper part of Karanja creek small sized *U. annulipes* were observed. Here, a phenomenon of decorating the burrow entrance with mudballs to attract the females was observed. After careful observation, it was also noticed that at such areas, burrows of the *U. annulipes* were found well above the intertidal area at edges of grass patches. At Vashi and Nerul shore along the side of drainage channels, large number of *Uca annulipes* collected throughout the year. While, along the edges of mangroves in lower littoral zone, *U. vocans* and *U. dussumieri* were collected. As compared to other studied sites, larger sized *Uca annulipes* were recorded at this site with density ranging from 45 to 70/ m^2. Table 2.2 gives distribution of the fiddler crabs collected from selected intertidal sites of Mumbai.

Table 1. Diversity of fiddler crab in Mumbai region

Sr. No.	Name of Species	Habitat	Locality
1	Uca annulipes	Soft sandy-muddy substratum and rich source of food in the form of fecal matter	Mudh Marvey jetty
		Sandy-muddy substratum with pebbles of various size and presence of fecal matter	Malad shore
		Sandy-muddy substratum with decomposed garbage.	Sewri shore
		Sandy-muddy substratum gets flooded with sewage water during high tide	Vashi and Nerul shore
		Sandy-muddy substratum and release of sewage makes it favourable site	Panvel and Karanja shore
2	Uca vocans	Soft sandy-muddy substratum and rich source of food in the form of fecal matter	Mudh Marvey jetty
		Sandy-muddy substratum gets flooded with sewage water during high tide	Vashi and Nerul shore
3	Uca dussumieri	Moderate cover of mangroves and muddy substratum	Vikroli shore
		Moderate cover of mangroves and soft loamy-muddy substratum	Vashi and Nerul shore

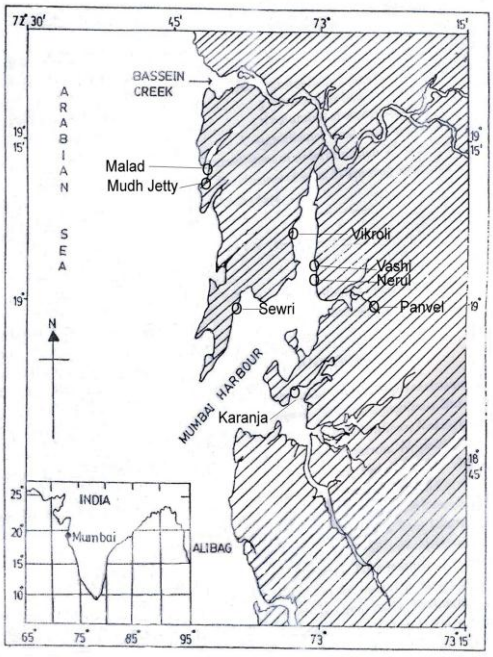

Figure 1. Map showing distribution of *Uca* Species in Mumbai region

Site	Species Present
Malad Shore	*Uca annulipes*
Mudh Marvey jetty	*Uca annulipes, Uca vocans*
Vikroli Shore	*Uca dussumieri*
Sewri shore	*Uca annulipes*
Vashi Nerul shore	*Uca annulipes, Uca vocans, Uca dussumieri*
Panvel Shore	*Uca annulipes, Uca dussumieri*
Karanja Shore	*Uca annulipes*

REFERENCES

Bairagi N. and Misra A. (1988). On the taxonomic status of *Gelasimus acutus* present in the national collection of the Zoological Survey of India, Calcutta. *J. Bombay Nat. Hist. Soc.* 85(2):449-451.

Burger J. Brzorad J. and Gochfeld M. (1991). Immediate effects of an oil spill on behavior of fiddler crabs (*Uca pugnax*). *Archives of Environ. Contamination Toxicol.* 20(3):404-409.

Chakraborty S. K. and Choudhury A. (1985). Distribution of fiddler crabs in Sundarbans mangrove esutarine complex, India. *Proc. Nat. Symp. Biol.* 467-472.

Chhapgar B.F. (1957). On the marine crabs (Decapoda – Brachyura) of Bombay state. Part I. *J. Bombay Nat. Hist. Soc*. 54: 399-439.

Chhapgar B.F. (1958). More additions to the crab fauna of Bombay state. *J. Bombay Nat. Hist. Soc.* 65(3): 608 – 617.

Jaiswar A. K. (1999). Intertidal biodiversity with reference to molluscs in and around Mumbai. *Ph. D. Thesis, University of Mumbai.*

Krebs C. T. and Burns K. A. (1977). Long-term effects of an oil spill on populations of the salt-marsh crab *Uca pugnax*. *Science.* 197:484-487.

Nagabhushanam R. (1964). Physiology of the red chromatophores of *Gelasimus annulipes. Ind. J. Exp. Biol*. 2(2):69-71.

Nagabhushanam R. (1968). The effect of osmotic pressure and ion on the response of black chromatophores in the crab, *Gelasimus annulipes*. Advance Abstracts of Contributions on Fisheries and Aquatic Sciences in India 2(4):47.

Nagabhushanam R. and Chinnayya B. (1968). Observations on the respiration of the crab, *Gelasimus annulipes*. *Sér. Ciênc. Nat.* 37:111-117.

Rosenberg M. S. (2001). The systematics and taxonomy of fiddler crabs: A phylogeny of the genus *Uca*. *J. Crusta. Biol.* 21(3):839-869.

