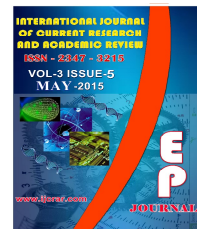




## International Journal of Current Research and Academic Review

ISSN: 2347-3215 Volume 3 Number 5 (May-2015) pp. 248-251

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### Insect fauna in Mangrove ecosystem of Bhatye estuarine region

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#### KEYWORDS

Bhatye estuary,  
Crematogaster ants,  
Rhizophora etc

#### A B S T R A C T

Bhatye estuary is situated at 73015' East and 16051' North near Ratnagiri on the west coast of India and known for the mangroves on the mud flats. Various mangrove species along with their associated flora form characteristic vegetation in this region. A thick mangrove vegetation of Bhatye region is formed predominantly by *Rhizophora mucronata* and *Sonneratia* species. In an attempt to study the insect fauna, nesting of *Crematogaster* ants on top branches of the trees was observed. At couple of places spiders, dragon flies, butterflies and mosquitoes were observed. Apart from the above, spiders were also encountered in the marshy islands of Bhatye Estuarine ecosystem. There were five varieties of *Crematogaster* ants – Queen, Drone, Soldier, Media Worker and Minor Worker

### Introduction

Mangrove conservation is very important as they are extremely productive ecosystems. Because mangroves occupy the intertidal zone, they interact strongly with aquatic, inshore, upstream and terrestrial ecosystems and in this way mangroves help to support a diverse flora and fauna of marine, freshwater and terrestrial species (Donald J. Macintosh and Elizabeth C. Ashton, 2002). Mangrove species diversity is well known for the larger animals and plants, but poorly known for microorganisms and insects. Study of its insect biodiversity can help in determining its potential productivity and in better management of mangroves.

Insects are the only class of animals which are so intimately involved in the intricacies and complexities of the biological world. Most of the vegetation in the forests will always have to depend on native insects for their reproduction and ecobalance. Hence they provide linkage between mangrove ecosystem and other ecosystems. The high abundance of insects in mangroves confirms their importance in mangrove litter detritus formation. The rich insect fauna found in colonizing in dead mangrove tree trunks and fallen timber increase the detritus formation (Santhakumaran, 1983). Mangrove insects were been studied from Southeast Asia (Beaver and Browne, 1975), Thailand

(Browne, 1961 and Murphy, 1990), Malaysia (Beason, 1953) and India (Kalshoven, 1958, 1959).

In studies related to mangrove insect biodiversity, numerous butterfly and moth species have been undertaken. Termites are an important component of the fauna but little is known about them. They burrow inside the trunks and branches of mangrove trees and maybe very important in breaking down dead wood. Ants are often abundant in the mangrove tree canopy suggesting their ecological significance but again not much is known about ants.

The Study area for the present work - Ratnagiri, is located on the west coast of India, bound by the Arabian Sea. Institute for Ocean Management has identified Ratnagiri under the category of ecologically important areas in the state of Maharashtra. Over 85% of the land is hilly. The outstanding feature in the relief of the district is its highly uneven nature and very narrow reverie plains that fringe the coastline. The predominant soils in the district are laterite soils. The Ranpar Jetty and Bhagvati Bandar Ports are the important ports. Interestingly, Bhatye Estuary happens to be one of the most important estuary along the coast and supports the commercial fishery of the coast. The estuary is characterized by thickets of mangroves present at the deltaic region where the river Kajli meets the Arabian Sea.

Insect fauna of mangroves has not been adequately researched in India. Hardly any information is available about the insects in mangrove areas. In the present studies, a sincere attempt has been made to explore the biodiversity of insect fauna of this region, which was neglected by the scientific community for so many years.

## **Materials and Methods**

The study area, Ratnagiri is situated at 17°North and 73°East and having an area of about 50,209 sq miles. The coastline of Ratnagiri district is 250 miles long and marked with several islands, which is a result of drowned topography. Ratnagiri coast has been blessed with luxuriant, thick mangrove vegetation with patches of other associated flora and fauna. The important estuaries along the Ratnagiri coast include Bhatye estuary, Kalbadevi Creek, Jaitapur Creek, Bankot Creek, Sakharthar, Shirgaon etc. Bhatye estuary is situated at 73°15' East and 16°51' North near Ratnagiri and known for the mangroves on the mud flats.

The present study was carried out in the Bhatye estuary. Six stations were selected within a stretch of about 25 Km Three zones were selected for sampling, considering the nature of study area. Zone-I include Station-1 and 2, which is a marine zone. Zone- II as middle zone occupies Mangroves Island (Station- 3 and 4), while Zone- III was riverine zone includes Station-5 and 6. Depth of the water column varied from 3-15 m. Sampling was done fortnightly covering intermediate phase of the tide to avoid tidal effect, if any. Diesel engine boat was used to reach different stations.

## **Result and Discussion**

Insects occur in different ecological niches of mangrove forest. They may be permanent residents or only transient visitors. They are either harmful or beneficial and plays an important role in ecology of mangrove ecosystems. Most of the insect species in mangrove habitats are only temporal visitors and they do visit many other habitats. As a result, the insects provide a linkage between the mangal and other environments.

In an attempt to study the insect fauna qualitatively (Table 1), we visited the mangrove island (Station II, estuarine zone) of Bhatye Estuary. We ventured into the thick mangrove vegetation formed predominantly by *Rhizophora mucronata* and *Sonneratia* species. To our surprise we

could find nesting of ants on top branches of the trees, when we collected the ant samples, they were found to be *Crematogaster* ants. At couple of places we could find spiders, dragon flies, butterflies and mosquitoes as well.

**Table.1** Insects found in Mangroves of Bhatye Estuary

Order	Insects
1. Odonata	Dragonflies
2. Orthoptera	Grass hoppers and Mole crickets
3. Heteroptera	Bugs
4. Coleoptera	Bettles
5. Lepidoptera	Butterflies
6. Hymoptera	Ants ( <i>Crematogaster</i> )

Apart from the above, spiders were also encountered in the marshy islands of Bhatye Estuarine ecosystem. But they still remain unidentified. The literature (Randive *et al*, 2002) reveals that there are five varieties of *Crematogaster* ants – Queen, Drone, Soldier, Media Worker and Minor Worker. The other observation made was, that the nest of these ants occur in thick vegetation where chances of human interference are remote. The nests are present at a height ranging from more than six feet upto 22 feet.

Hence, it would be interesting to know how these particular ants must have evolved to survive in such a diverse habitat. More biological and ethological observations seem to be essential to understand more about their behaviour and ecological linkages with the mangals.

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