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Preliminary Studies on Diversity of Order Coleoptera at Sawanga-Vithoba Lake Region, District Amravati, Maharashtra, India

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ABSTRACT

Beetles constitute a large quantity of total insect biodiversity and play a key role in trophic chains. The order coleoptera are well represented in all terrestrial habitats and are often used as indicators of environmental change because of their great habitat specificity. Life cycles of many beetle are linked to soil and ground litter and are affected by environmental changes caused by various human activities (agriculture, urbanization, etc.). The present study was conducted for a period of twelve months at different study sites at Sawanga Vithoba Lake (Malkhed Project), dist-Amravati, Maharashtra. In total 27 beetle species belonging to 07 families were found at Sawanga Vithoba Lake. Family Scarabidae is the most dominant family exploring 40% of species.

Key words: Diversity, coleoptera, Sawanga Vithoba lake

INTRODUCTION

Soil arthropods are diversified (Giller, 1996) and are important for mineral element recycling and soil structure dynamics and other ecological functions (Setala *et al.*, 1998; Wall and Moore, 1999; Barros *et al.*, 2004). Soil characteristics can affect soil invertebrate communities (Beare *et al.*, 1997; Fragoso *et al.*, 1997; Giller *et al.*, 1997; Barros *et al.*, 2002, 2003; Decaens *et al.*, 2004) and therefore may modify soil structure and functions.

Coleoptera is the most diverse order of class Insecta; Phylum Arthropoda. India is rich in Coleopteran fauna. There are more than 3,50000 identified species of beetles that is about 40% of all insects and 30% of all animals (Choate, 2001). Beetles are observed in almost every habitat and range in size from 1-100 mm.

Beetle's is the one of the biggest order of animal kingdom. They play important role in most ecosystems (Ehrenfeld, 1988). Beetle species contribute as the largest number of total insect biodiversity and are important component in trophic chains (Leraut, 2003). The Coleoptera are well represented in all terrestrial habitats. It is specific in habitat preference and thus can be used as indicator of environmental change (Forsythe, 1987; Lovei and Sunderland, 1996). Changes in environmental factors due to various human activities may affect life cycle of beetles as it is associated to soil and ground litter.

Beetles vary in colour, shape and size from tiny to large and are strongly sclerotized. Few characteristics makes beetles more successful such as presence of elytra which protects the folded

hindwings, compound eyes ect. In some beetle species wings are reduced (Arnett, 1973). Beetles exhibit ecological and biological diversity. Most of the species of beetle are terrestrial and herbivores; many are predatory. Many species of beetles are pest. Ecosystem roles of many beetles are not understood yet. The aim of the present study is to understand the distribution of the order Coleoptera at Sawanga-Vithoba lake region, district Amravati, Maharashtra, India.

MATERIALS AND METHODS

The present study was conducted for a period of twelve months at different study sites at Sawanga (Vithoba) Lake situated in Pohora forest of district Amravati. Amravati district is located in Maharashtra state of India between 20°32' and 21°46' north latitudes and 76°37' and 78°37' and 76°27' east longitudes.

METHODS

- **Sampling methods:** Surveys were conducted in all the seasons. All surveys were conducted in the morning hours between 7:00 am to 11:00 am
- **Sweep netting:** Beetles from herbaceous-shrub-small tree vegetation was collected using standardized insect collecting net
- **Beating sheets:** Beetles from trees and woody shrubs were dislodged and collected on a sheet by beating trees and shrubs with a stick
- **Active searching and hand picking:** In this method Beetles specimen were actively searched under rocks, logs, ground debris and loose dead barks of trees etc
- **Photography:** Collected Beetles were photographed by the digital camera (Make-Sony Model No. W-310) and identified and later were released into their natural habitat
- **Identification:** All specimens were initially separated from other material and identified to the family level using the taxonomic keys (Lindroth, 1992; Bousquet, 1990). Few Beetles were observed under stereo zoom microscopes (model No. MS 24). Identification was done on the basis of morphometric characters of various body parts

RESULTS

Total 27 species under 7 families (Table 1) were recorded during the present study at Sawanga-Vithoba Lake region. This area is rich in floral diversity. Scarabidae is the most represented family with 11 species. Other families of beetles such as Chrysomelidae, Buprestidae, Gyrinidae, Cerambycidae Meloidae Scarabidae Tenebrionidae were recorded. Five species belong to family Cerambycidae and Meloidae each, 3 species belong to family Tenebrionidae and one species belongs to family Chrysomelidae, Buprestidae, Gyrinidae, each. Thus family Scarabidae is the most dominant family exploring eleven species, second dominant families are Cerambycidae and Meloidae with five species, family Tenebrionidae exhibits three species while families Chrysomelidae, Buprestidae, Gyrinidae reveal one species each. Distribution of beetles at Sawanga-Vithoba lake is illustrated in Table 1.

Family Scarabidae is the most dominant family exploring 41% of species, second dominant family is Cerambycidae and Meloidae with 18% species each, family Tenebrionidae exhibits 11% species while families Chrysomelidae, Buprestidae and Gyrinidae reveal 4% of total species. Distribution of different families of beetles at Sawang-Vithoba lake is illustrated in Fig. 1.

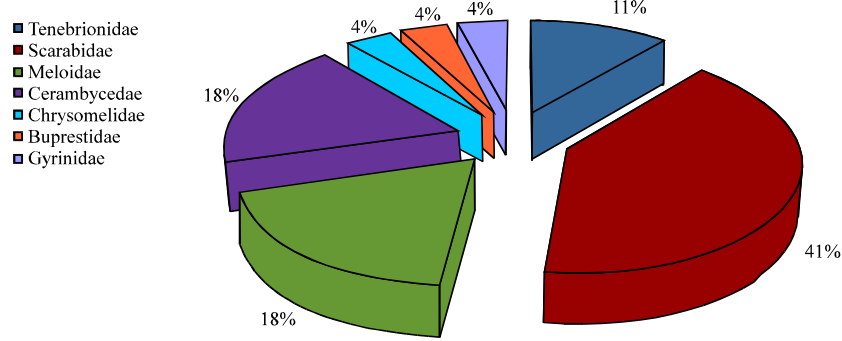


Fig. 1: Distribution of families of beetles at Sawanga-Vithoba lake

Table 1: Distribution of beetles at Sawanga Vithoba lake region district Amravati, India

Name of species	Family
<i>Coelocnemis californicus</i>	Tenebrionidae (3)
<i>Rhytinota</i>	
<i>Opatrum sabulosum</i>	
<i>Heliocopriss bucephalus</i>	Scarabidae (11)
<i>Onthophagus</i> sp.	
<i>Onthophagus</i> sp.	
<i>Onthophagus</i> sp.	
<i>Onitis philemon fabricius</i>	
<i>Onthophagus</i> sp.	
<i>Phyllognathus dionysius</i>	
<i>Holotricha</i> sp.	
<i>Brahmia</i> sp.	
<i>Copris</i> sp.	
<i>Onitis</i> sp.	
<i>Mylabris</i> sp.	Meloidae (5)
<i>Mylabris</i> sp.	
<i>Epicauta pennsylvanica</i>	
<i>Mylabris</i> sp.	
<i>Mylabris</i> sp.	
<i>Malldon dasystemus</i>	Cerambycidae (5)
<i>Omphra</i> sp.	
<i>Chlaenius</i> sp.	
<i>Cryptocephalus sexsignatus</i> Fabricius	Chrysomelidae
<i>Psiloptera orientalis</i> Laporte and Gory	Buprestidae
<i>Dineutes indicus</i>	Gyrinidae

DISCUSSION

In total 27 species of beetles from Sawanga-Vithoba lake (Malkhed Project) dist. Amravati, Maharashtra, India were recorded. Thus high species diversity of beetles in this area can be attributed to the high diversity of plants and insects. High plant diversity (*Tectona grandis*, *Acacia catechu*, *Butia monosperma* etc.) provides varied microhabitat for invertebrates and in turn can maintain a high diversity of fauna. In my knowledge, there is no previous work in this area regarding the diversity of beetles. This indicates the need for further study in this area. The

multifaceted interactions of different factors like rainfall, temperature water availability may generate many smaller and diverse environmental niches in this area. Sawanga (Vithoba) lake area can be a good and important centre of speciation due to presence of forests, bushes, sand and water.

Many environmental factors affect diversity of species (Rosenzweig, 1995). There is always correlation between structural complexities of habitats and diversity of species (Hawksworth and Kalin-Arroyo, 1995). More diversity is observed at the region with availability of variety of habitats (Ried and Miller, 1989). Good beetle diversity is seen on structurally complex shrubs (Uetz, 1991).

In present study diversity of beetles of 7 different families viz., Gyrinidae (Whirligig beetles), Tenebrionidae (Darkling beetles), Carabidae (Ground beetles), Scarabaeidae (Scarab beetles) and Meloidae (Blister beetles) are recorded. The percentage of different beetle families recorded in the study area is given in Fig. 1. The 18 species belonging to 16 genera over nine families are observed at Kalatop-Khanjjar Wildlife Sanctuary, Himachal Pradesh, India (Sharma *et al.*, 2004). The 102 species of 13 different families of coleopteran were recorded at Thar Desert, Rajasthan, India (Kazmi and Ramamurthy, 2004). Forty taxa under seven families of streams beetle are observed at Nizke Beskydy Region (Slovakia) (Zatovicova *et al.*, 2004). At Kolkas region of Melghat Tiger Reserve, Central India, 13 species of water beetles under families Dytiscidae, Hydrophilidae and Gyrinidae were recorded (Thakare and Zade, 2011). In 11 provinces, fifty-three species are found in 70 low elevation caves (Peck *et al.*, 1998). A total of 580 specimens belonging to five genera, *Adalia* sp., *Hippodamia variegata*, *Halyzia* sp., *Coccinella* sp. and *Coelophora* sp. are reported at an altitude of 2704-7135 m above sea level (Tara and Feroz, 2009). Forty four species of scarab beetles in 24 genera of 8 subfamilies were recorded from Bandhavgarh National Park, Madhya Pradesh (Chandra and Ahirwar, 2005). G.N.H.P. Himachal Pradesh, India recognized 9 species of 4 subfamilies of beetles (Chandrna, 2007). In the Azores Ten species of cavernicolous ground beetles were recorded (Borges *et al.*, 2007).

CONCLUSION

Sawanga-Vithoba lake (Malkhed Project) dist Amravati, Maharashtra, India is rich in beetle diversity with 27 species belonging to 7 families. Family Scarabidae is the most represented family. Sawanga-Vithoba lake region could be an important centre of speciation in Pohara forest of dist. Amravati, India.

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