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Diversity and Distribution of Earthworms in Relation to Altitude and Soil Factors of Kollam District, Kerala State, India

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ABSTRACT

Kollam District, Kerala State, India, is bordered on the west by the Lakshadweep (Arabian) Sea, and on the east by the hills of western ghats. The district was broadly divided into three regions of coastal zone, midland and highland. Earthworms and soil were sampled from 38 stations located within these regions during February-April, 2013. There was a difference on the major soils of three regions. A significant difference existed between the three regions on mean values of soil temperature, moisture, sand, silt and clay. Positive correlations were observed between the density of earthworms and sand and calcium, and an inverse one between density and soil temperature and clay. The pH of the soil was near neutral to acidic, and majority of stations had sandy clay loam soils. A total of six families and twelve species of earthworms were sampled from different stations. The earthworms were either epigeics, endogeics or anecies, and two species of earthworms were exotic and ten natives. Their diversity and distribution in relation to soil and geographic factors were described. The Shannon diversity

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and evenness indices were higher in highland. The roles played by the earthworms of Kollam district on soil fertility, aeration and vermicomposting were discussed.

***Key words*:** Earthworms, Kollam district, Coastal zone/midland/highland, Physico-chemical analysis of soil, Soil composition and texture, Epigeic/endogeic/anecic, Soil fertility and vermicomposting.

INTRODUCTION

Earthworms (Annelida: Oligochaeta) form one of the major macrofauna among soil biota to maintain dynamic equilibrium and regulate soil fertility (Tomati and Galli, 1995). They are designated as 'Ecosystem Engineers' and play an important role in improvement of soil physical structure, organic matter dynamics and nutrient cycling rate through their feeding, burrowing and casting activities. Some earthworms are used for composting the waste organic matter also.

In Indian sub-continent, earthworms form the bulk of Oligochaeta fauna and are represented by 590 species and 67 genera with different ecological preferences, but the functional role of majority of species and their influence on the habitat are lacking (Julka, 2001). The earliest record of Indian earthworms was published by Bourne (1888) from western Himalayan region. A general description on earthworms and their role in the soil ecosystem, an overview of biodiversity of Indian earthworms were furnished by Julka (2010) and Julka *et al*. (2009). A comprehensive check-list of earthworms of Indian sub-continent was prepared and documented in the website (2006). The description of the earthworm diversity on the western ghats in India stretching from Kerala in the South to Gujarat State in the North is furnished by Stephenson (1915, 1923, 1925), Gates (1945), Soota and Julka (1972), Jamicson (1977), Julka and Rao (1982), Blachart and Julka (1997), Kale and Karmegam (2010), Mahesh Mohan *et al*. (2011), Shylesh Chandran *et al*. (2012) and Siddaraju *et al*. (2013).

Not much information is available on the occurrence, distribution and diversity of earthworms in relation to geographic and edaphic factors of different regions of Kerala State in general and southern Kerala in particular. The present study, therefore, was undertaken with a view to know the earthworm resources of Kollam district located in southern Kerala, India. The aim of the study was to gather information on the distribution of different species of earthworms in relation to geographic and edaphic factors of the district. Such a study is important to know the roles played by these worms on the structure and fertility of soils of Kollam district.

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About the Volume

Biodiversity is the variety of life on earth within and between all the species of plants, animals, micro-organisms and the biosphere in which they live and interact. It includes millions of different species that live on earth besides the genetic differences within species. Extinction is a native process that takes place over long period of times because of natural shifts in the environment. Last century witnessed a large number of species going extinct at an alarming rate due to environmental changes of habitat loss and pollution caused by human activities. Passenger pigeon, paradise parrot, desert rat kangaroo, Tasmanian tiger, Arabian ostrich and hundreds more are now extinct. Biodiversity needs to be conserved because it is essential for life support system and makes life sustainable on earth. Wetlands filter pollutants from water, plants and trees reduce global warming by absorbing CO_2 and micro-organisms break down organic material and fertilize the soil. Medicines originating from plants and animal species save millions of lives and relieve tremendous suffering. In this context, volume 2 presents articles on biodiversity and conservation from biodiversity of medicinal plants and their conservation to bioactivity of mushrooms to molecular diversity of fish to threats to marine and forest biodiversity.

The volume 2 provides discussion on the following topics::

- Biodiversity and conservation
- *Tapping into biodiversity*: From metagenomics to industrial enzymes
- *Trichoderma*: Biodiversity and species concepts
- Diversity and distribution of earthworms in Kollam district of Kerala
- Diversity towards seeds morphology, anatomy and physiology for endemic species in Madagascar
- Conservation of medicinal plants
- Endophytic fungal diversity in medicinal plants
- *Carum copticum* herb for treatment of important human diseases
- *Bioactivity of mushrooms*: Exploitable properties for drug development and health care
- Vascular flora of rocky outcrops in an ecotonal area in north-eastern Brazil
- Molecular diversity of fish based on DNA markers
- Threats to marine biodiversity in Arabian gulf
- Integrated management of coral bleaching and migration
- *Biodiversity*: Threats and conservation
- European union and Greek forestry

The volume spreads over 15 articles contributed by 31 authors representing 8 nations *viz*. Bahrain, Brazil, England, Greece, India, Madagascar, Malaysia and United States of America giving an overview of the activities being carried out in different parts of the world by researchers on *Biodiversity and Conservation*.

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