



INTERNATIONAL JOURNAL OF PHARMACY & LIFE SCIENCES
(Int. J. of Pharm. Life Sci.)

**Pilot study to record the soil meso and macro fauna of
JnanaBharathi Campus of Bangalore University, Bengaluru**

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Abstract

The present paper deals with investigation of soil meso and macro fauna in selected study sites of campus of Bangalore University, India.

Key-Words: Fauna, Pilot study, Soil

Introduction

Soil organisms are creatures that spend all or part of their lives in the soil including soil micro, meso and macrofauna. Literature on soil fauna pertaining to various aspects in the Indian context are detailed as follows. Climate change, both elevated temperature and eCO₂ impacts on soil biota (Joseph *et al.*, 2011). Srinivasareddy (2002); Rashmi *et al.* (2009) reported variation in soil faunal population due to application of various agro-chemicals. Soil moisture content played important role and developed a significant correlation with the monthly population density of collembolan in Manipur (Mema Devi *et al.*, 2011). Exploration of species composition and population density fluctuation of collembolans and soil mites in cropland and wetland was undertaken by Lalet *et al.*, (2011) in Northern Bihar. Population buildup of soil microarthropods is influenced by both abiotic and biotic factors and their interaction (Narula *et al.*, 1998). Many workers have reported higher population buildup during rainy season and a sharp decline during summer months (Jam *et al.*, 1986; Reddy and Venkatesh, 1990; Reddy *et al.*, 1992; Hazra and Sanyal, 1996).

Based on literature perusal it was evident that minimal research was undertaken to document the diversity and density of soil fauna in India. Also, no reports was available with regard to the present selected study area, hence an attempt was made to document the soil (meso and macro fauna) in the selected study area.

Material and Methods

Selection of study area

Four specific sites (1= Department of Zoology environ, 2= Gandhi Bhavan Forest Department Nursery, 3= Biopark, 4= Physical Education department environ) were selected within Bangalore University JnanaBharathi Campus, Bengaluru South taluk, Bengaluru Urban District. The study area was selected as it was a scrub forest with easy access.

Sampling

Sampling was undertaken randomly in each selected site during four consecutive visits (n = 4) during 2013-14. Soil organisms (macro and mesofauna) were visually counted and either photographed or collected for classification into different taxa. Simple pictorial keys were used identify the taxa upto order level. Techniques used include, basic extraction method, direct observation and photography. The data collected during the visits was coupled to analyse and deduce the biodiversity indices.

Data analysis

Biodiversity indices and Cluster analysis was performed using PAST Software. Statistical analysis (One- way ANOVA) was performed using S and SS Software (version 11).

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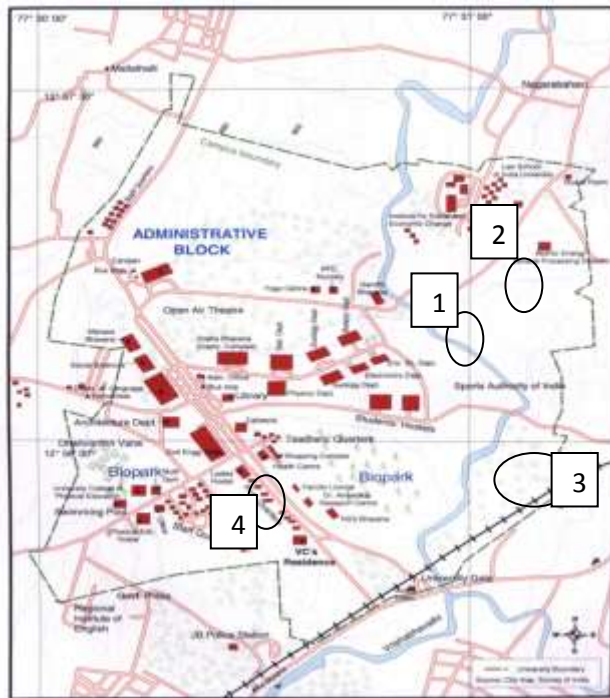


Fig. 1: Study area of JnanaBharathi campus
 1= Department of Zoology environ, 2= Gandhi Bhavan Forest Department Nursery, 3= Biopark, 4= Physical Education department environ

Results and Discussion

The present findings are a first time documentation of soil fauna covering four diverse sites in the JnanaBharathi Campus. Because of this fact our results could be compared with other data. The density of soil

fauna recorded during the study is presented in Figure 2. It is evident that high diversity and density of soil fauna was recorded during the first three visits compared to the third visit. However, based on One way ANOVA no significant difference obtained between the four study sites, $F(3, 64) = 0.584, p=0.63$. Diversity indices of the field records indicate a good value of simpson (1-D) indicating rich diversity in the studysites (Table 1 and Figure 3), Gandhi Bhavan (0.69), Department of Zoology (0.62), Department of Physical Education (0.64) and Biopark (0.52). The Shannon index is also higher indicating abundance and evenness in the diversity of soil fauna recorded. Based on the clustering obtained (Figure 4), two major clusters based on density of fauna was recognised, araneae, Hymenoptera and Isoptera forming one cluster and the rest forming the other cluster.

A substantially good diversity of soil organisms were recorded during the present survey undertaken in Bangalore University, Bengaluru. The present study is special in various aspects; it is a pilot study and preliminary undertaken for the first time undertaken in the Bangalore University campus. Secondly, numerous records of soil organisms are reported in spite of the short duration variable. Thirdly in the comprehensive sense the data is presented up to order level only. In conclusion extensive survey to record the biodiversity relating abiotic factors needs to be undertaken in the future.

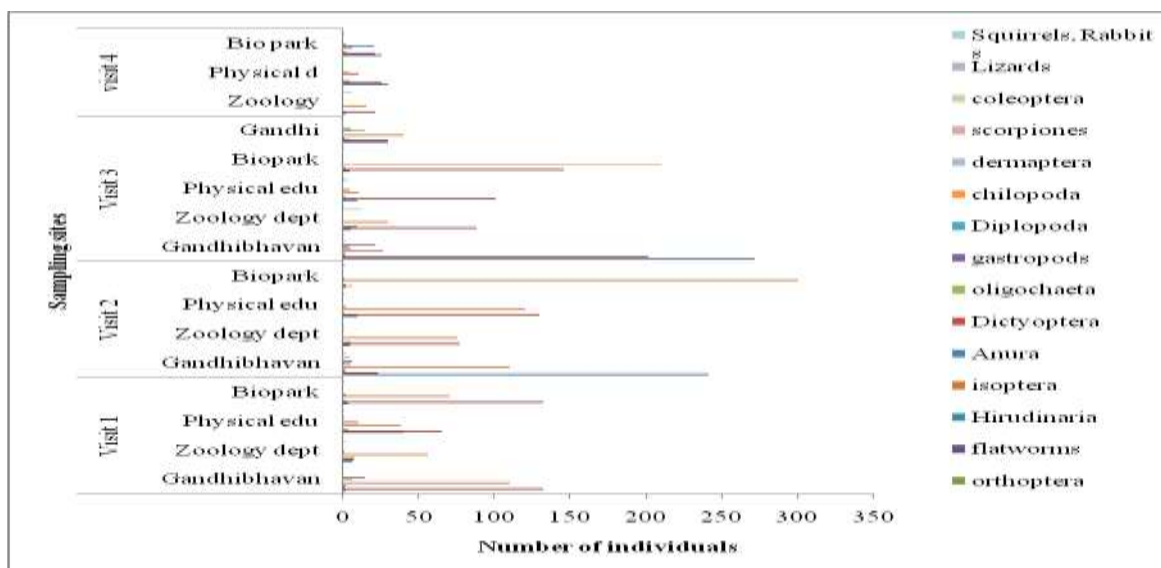


Fig. 2: Density counts of soil fauna in the study site

Table 1: Biodiversity indices of Soil fauna sampling in the study area

	Gandhi Bhavan	Department of Zoology	Department of PE	Bio park
Taxa_S	10.00	7.00	9.00	8.00
Individuals	1318.00	431.00	622.00	963.00
Dominance_D	0.30	0.37	0.36	0.47
Simpson_1-D	0.70	0.63	0.64	0.53
Shannon_H	1.37	1.18	1.26	0.96
Evenness_e^H/S	0.39	0.47	0.39	0.33
Brillouin	1.36	1.15	1.23	0.95
Menhinick	0.28	0.34	0.36	0.26
Margalef	1.25	0.99	1.24	1.02
Equitability_J	0.60	0.61	0.57	0.46
Fisher_alpha	1.47	1.19	1.49	1.20
Berger-Parker	0.41	0.45	0.51	0.61
Chao-1	10.00	8.00	9.00	8.00

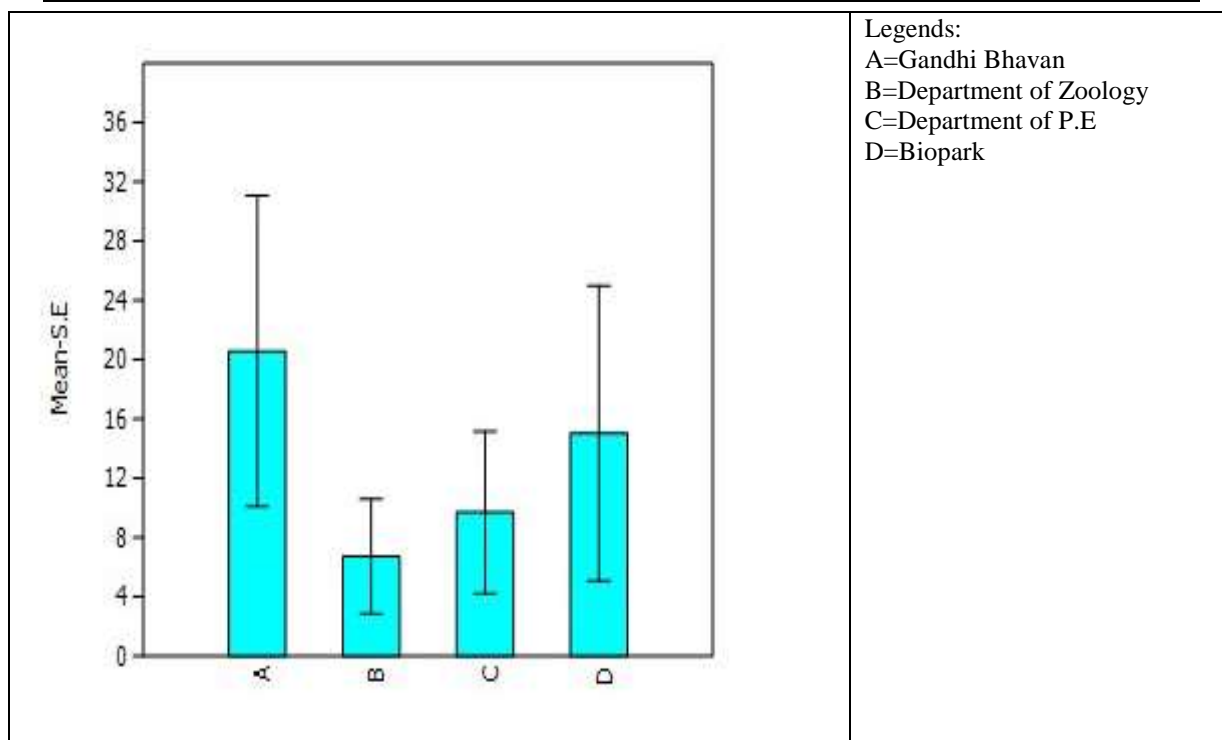


Fig. 3: Mean ± S.E plots of soil faunal density in the study sites

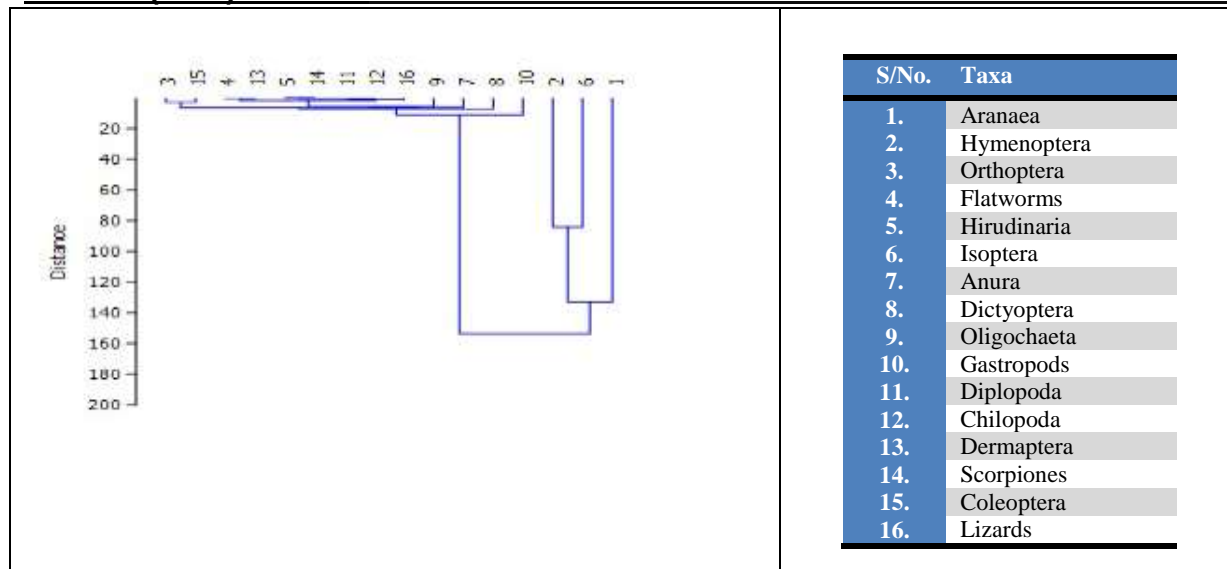


Fig. 4: Dendrogram produced by hierarchical clustering of soil fauna assemblage in the study sites

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How to cite this article

Ramakrishna S., Rajesh N., Bharthi R., Divyashree G., Priyanka L., Sowmya B. H., Sudhaand D. and Jayashankar M. (2014). Pilot study to record the soil meso and macro fauna of JnanaBharathi Campus of Bangalore University, Bengaluru. *Int. J. Pharm. Life Sci.*, 5(6):3607-3610.

Source of Support: Nil; Conflict of Interest: None declared

Received: 24.05.14; Revised: 30.05.14; Accepted:03.06.14

