"INVENTORY OF ORIBATID MITES OF NILAMBUR FOREST RESERVE, WESTERN GHATS, INDIA"

SUMMARY OF THE UGC FUNDED MINOR RESEARCH PROJECT
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SUMMARY

India being an agricultural country primarily, the fertility of soil is of utmost importance. The richness and variety of soil in different parts of the coutnry provide an ideal habitat where a wonderful array of mites thrives luxuirously. Among the various groups of soil mites, the maximum credit goes to the oribatid mites because of their vital role in the break down of litter thereby helping in soil humification process. Kerala is enriched with varied floral elements providing bountiful food resources not only to the plant parasitic forms but also to the members of the soil fauna, when the floral rudiments reach as litter in the soil. Oribatid mites which are known to be free living detritus feeders are abundant in such litter accumulated areas. The detection of panphytophagy in majority of species studied earlier indicates that in Kerala soils, mites take part a much significant role in degradation. Mites play earth-shattering role in the usual transaction of organic residues in the soil ecosystem due to their speckled activities. They render an innovative service to mankind aiding in the process of biodegradation thereby helping in the nutrient cycling and energy flow. Another spectacular area of mite activity is in the bioindication of soil conditions. This incredible ability is acquired through their extreme sensitivity to the physico-chemical characteristics of their immediate surroundings. Above all, most of the Oribatid mites are panphytophagous in nature, feeding on a wide range of food resources comprising both lower and higher plant materials and which exert an energetic influence on soil humification process, leading to enrichment of soil fertility. They show uniform worldwide distribution and high adaptability to survive and replenish in altering environmental conditions. The present study was envisaged with a view to carry out an in-depth study on the systematic and biological details of some of the taxa of oribatid mites, which exert a terrific impact on soil humification and nutrient cycling, leading to enrichment of soil fertility.

The study was focused to gather information on the habitat, distribution pattern, species diversity, abundance and systematic details of the most common and locally important taxa of oribatid mites. The above objective was achieved through intermittent sampling of soil/litter samples covering different seasons from varied habitats of

Nilambur Reserve Forest. The locality selected was Panagode Forest of Nilambur Reserve Range and the sites preferred was:

Site I: Plantation of ***Swietenia mahagoni*** and *Swietenia macrophylla*

Site II: ***Bambusa bambos*** Vegetation

The collected samples were subjected to extraction through modified Berlese-Tullgren funnel apparatus to separate the mites. The mites were collected in preserved condition for taxonomic studies and live condition for biological studies. Preserved specimens were dehydrated in alcohol series and cleared in 1:1 mixture of lactic acid and ethanol, mounted in Hoyer's/PVA media and identified following appropriate keys and relevant literature and confirmed with the help of concerned experts. Drawings of the various species were made with the help of Camera lucida attached to a Magnus research microscope. Results of the general survey carried out on the oribatid mites inhabiting the varied collection sites disclosed the rich diversity of these mites and the impact of geographic characters on their relative distribution pattern. A total of 1782 individuals from 64 species belonging to 44 genera under 29 families and 20 superfamilies could be collected as representatives of oribatid mites, during the study period. All though representatives of different Infraorders, Enarthronata, Holosomata, Mixonomata, Paleosomata, Parhyposomata and Brachypylina were recovered from soil sample, Enarthronata, Holosomata, Mixonomata, Paleosomata, Parhyposomata was represented by 8 species belonging to 8 genera.All the remaing 56 species belonged to Brachypylina Hull,1918.

The Superfamily Oripodoidea exhibited the maximum family diversity, accommodating members of 5 families viz. Caloppiidae, Haplozetidae, Scheloribatidae , Protoribatidae Tetracondylidae. The super family Amerobelboidea with 3 families Basilobelbidae, Eremulidae, Machadobelbidae. The super family Tectocepheoidea with Tectocepheidae, Tegeocranellidae and Super family Nothroidea also with Tryhypochthoniidae, Malaconothridae and while the remaining 16 superfamilies supported members of a single family each. Thus the superfamily representation of the b oribatids recovered during the present study could be presented as (Plate Fig.): Oripodoidea > Amerobelboidea > Tectocepheoidea = Gustavioidea = Carabodoidea =

Licneremaeoidea = Microzetoida = Oppioidea = Galumnoidea = Phenopelopoidea = Plateremaeoidea = Trizetoidea = Zetomotrichoidea.

The families Oppiidae showed maximum generic diversity, supporting 5 genera each. The families Tryhypochthonidae, Haplozetidae Scheloribatidae and Galumnidae were represented by members of 3 genera each while Basilobelbidae, Carabodidae, Otocepheidae, Suctobelbidae included members of 2 genera. The rest of the families were found represented by a single genus each.

Scheloribates was recognized as the most diverse genus, represented by members of 7 species. The second position was achieved by *Galumna,* which included members of 5 species. The third position was shared by and *Protoribates*, comprising 4 species each, followed by *Eremulus,* with 3 species. The genera *Dolicheremaeus, Ischeloribates, Carabodes, Suctobelba* and *Brachioppia* were represented by 2 species each. The remaining genera were found represented by a single species, thereby disclosing the minimum diversity.

Results of the species distribution pattern of the various oribatid species recovered during the study provided substantial evidence to confirm the influence of vegetational characteristics on the faunal composition of oribatids. This was quite evident in the two sites selected in Nilambur Forest Reserve of Malappuram district. varied vegetational and geographic peculiarities were the sites surveyed for oribatid mite collection.

The morphological description of 10 species were carried out with proper and detailed illustrations.

Site 1 with ***Swietenia macrophylla*** and ***Swietenia mahagoni*** and species recovered only fromsite was viz., *Basilobelba indica, Xiohobelba ismalia, Trimalaconothrus duoaculeus, Indoribates philippinensis, S. thermophillus**,** S. decarinatus, Ischeloribates lanceolatus, P.punctata Galumna flabellifera, Allogalumna pellucida, Pergalumna,bimaculata, Eupelops tahitiensis, Eupelops tahitiensis, Pheroliodes elegans, Suctobelba granulate, Ghilarovus elegans, Zetomotrichus plumosus, Megalotocepheus japonicas, Ghilarovus elegan.*

Site 2 with ***Bambusa bambos*** ,the species recovered only from this sites was *Cosmochthonius zanini, Machodobelba symmetrica, Cultroribula lata, Austrocarabodes elegans, Scutovertex sculptus, B. cuscensis Chaunoproctus abalai, Magyaria ornate, Peloribates asejugalis, S. rectus, I. cavernicolus, G.undulata G.chujoi, Tectocepheus velatus, Tegeocranellus laevis, Suctobelba variosetosa, Otocepheus plumosus.*

All the 29 species were found in both the sites.The species diversity of the oribatid mites included in the 2 sites could be presented as:

Site 1 > Site 2:

The Tax of site 1 recovered was 50 and site 2 was 44. A total of 1782 individuals were collected from both sites, out of which from site 1 was 942 and from site 2 was 840 individuals.The Dominance of site 1 was 0.02109, and site 2 was 0.02377. The Shanon index of site 1 was 3.884 and site 2 was 3.761. The Simpson index of site 1 was 0.9789 and site 2 was 0.9762.The species evenness of site 1 was 09728 and site 2 was 0.9768.

Major factors effecting the diversity or abundance of oribatid mites include soil nutrient, moisture content and temperature, physical soil disturbance and interaction with soil fauna. The Shannon-Wiener index provided a useful and widely used alternative method for examining oribatid community structure. Results of sampling disclosed a great deal of structural variation in the oribatid species diversity and density in the locality surveyed. The variation observed in the oribatid diversity and density could be attributed to the topography of the soil, floral composition and presence of organic litter. The oribatid mites exert diverse feeding trends which enable them to play significant role in bioprocessing of organic litter through their mechanical break down, microbial inoculation and also stimulation of micro flora.