

Study of Diversity of Macro-fauna from the Household Biocompost

Gayatri A. Sagade and M. K. Pejaver

Department of Zoology, B.N.Bandodkar College of Science, Thane.

Abstract: Bio-composting is one of the most beneficial and eco-friendly activity in current age to cope up with the increasing pollution in all the strata. Household composting is a simple way to manage kitchen and garden waste. In this compost, along with the microbes, there is a large population of insects and other helpful macro organisms, however, the data available is fragmentary and it is necessary to have a detail investigation of the same. Hence, the study was carried out to find the diversity of macro organisms from different household Biocompost. Different extraction methods were used for the separation of fauna. 4 major phyla viz. Nematoda, Annelida, Arthropoda and Mollusca were represented in the study. Phylum Arthropoda showed dominance with total 15 organisms while representation of Phylum Mollusca, Annelida and Nematoda was at lower ebb. The observations thus reveal the un-noticed diversity of the household biocompost.

Keywords: Bio-composting, Diversity of organisms, Macro-fauna in compost.

Introduction:

'Want not, waste not' is today's slogan for the growing pollution status in India. According to the studies by Agarwal *et.al.* (2005), about 48 million tons of urban municipal waste is generated daily in India and almost 20-25% of this waste includes biodegradable trash which can be composted instead of dumping on the usable land or in water streams. For years together this biodegradable garbage is being treated naturally by the decomposing actions of various organisms but due to population explosion in recent years, it is not being decomposed in natural way. Hence composting is coming out as an alternative to the disposal of biodegradable materials along with the recycling of these wastes. Composting could be defined as Controlled aerobic decomposition of biodegradable organic matter by the action of micro as well as macro-organisms. Among these organisms, focus has been given on various microbes and earthworms but other macro organisms in the compost are not studied much. As cited by Odum (1971) in his book Fundamentals of ecology, earlier, the micro-consumers were the only ones designated as decomposers but recent work has shown that in some ecosystem, animals are more important than bacteria or fungi in the decomposition of the organic matter. Hence it seems preferable not to designate any particular organism as decomposer, but rather to consider decomposition as a process involving all of the biota & biotic processes as well (Forbes 1887, Tansley 1935, Evans 1956 & Cole 1958) Hence along with earthworms, this un-noticed macro fauna of the compost pile, should also be studied, in order to find both the biodiversity of the compost pile and their contribution in the compost. These hidden and undiscovered decomposers are equally important in the compost and it was essential to study their role in the compost. Therefore this sincere attempt was made to bring them in the light and give them the due credit.

Material and methods:

The compost samples contained household kitchen waste which chiefly included stalks and peelings of vegetables, leftover food, egg shells and remnants of non vegetarian food like bones and scales. Samples were collected from all the layers of the compost pile so that organisms present at different depths could be collected. For the extraction of the compost fauna, at present no standard methods are available. Hence the methods used for extraction of soil organisms were modified and used in study. Mechanical methods like Hand sorting, direct microscopic observations and few Flotation methods were used. The organisms were collected using pointed as well as blunt forceps and were preserved in mixture of Absolute alcohol and Glycerol (70:30). For identification of organisms till family level, "A general textbook of Entomology" by Imms A.D. (Ninth edition 1957) was referred.

Results and discussions

Diversity of macro fauna:

In the present study, this macro fauna was represented by 4 major phyla viz. *Nematoda*, *Annelida*, *Arthropoda* and *Mollusca*. Each organism was studied up to order level and whenever possible, up to genus level. The Macro-organisms which were observed are listed in Table 1.1.

Phylum Nematoda, Annelida and Mollusca were represented by two organisms each belonging to same order. As shown in Table 1.1, Phylum Arthropoda was dominant which included 15 organisms from four subphyla, five classes, nine Orders and eight families. Among this phylum greatest number of organisms was showcased through class Insecta. While Beetles of order Coleoptera represented four families and displayed maximum variety.



Phylum Nematoda
(Nematode worms)



Phylum Annelida
(Earthworms)



Phylum Mollusca (Snails)



Phylum Arthropoda (Beetle)

References:

Agarwal, A., A. Singmar, M.Kulshrestha, A.K. Mittal, (2005).Municipal solid waste recycling and associated markets in Delhi, India. Resource Conservation and Recycling, 44, 73-90.

Cole, LaMont C. (1958). The ecosphere. Sci. Amer., 1984(4):83-96.

Evans, Francis C. (1956).Ecosystem as the basic unit in ecology. Science, 123:1227-1228.

Forbes, S.A. (1987). The lake as a microcosm. Bull. Sc. A. Peoria. Reprinted in Ill. Nat. Hist. Surv. Bull., 15:537-550, 1925.

Imms A.D. (1957)A general textbook of entomology. (9th edition)

Odum E.P.(1971) Fundamentals of ecology.pp.10-31W.B.Saunders Company. Philadelphia, London, Toronto. Toppan Company, Ltd. Tokyo, Japan.

Tansley, A.G. 1935. The use and abuse of vegetational concepts and terms. Ecology, 16:284-307.

Table I.1 : Diversity of Insects found in the Biocompost

Phylum	Sub phylum	Class	Sub class	Order	Sub order	Family
Nematoda		Secernentea	Rhabditia	Rhabditida		
Annelida		Clitellata	Oligochaeta	Ophisthophora	Lumbricina	Megascolecidae
Arthropoda	Crustacea	Malacostraca	Pericarida	Isopoda		Oniscidae
	Hexapoda	Entognatha		Collembola		
	Hexapoda	Insecta	Pterygota	Coleoptera	Polyphaga	Scarabaeidae
	Hexapoda	Insecta	Pterygota	Coleoptera		Tenebrionidae
	Hexapoda	Insecta	Pterygota	Coleoptera	Adephaga	Nitidulidae
	Hexapoda	Insecta	Pterygota	Coleoptera	Polyphaga	Staphylinidae
	Hexapoda	Insecta	Pterygota	Diptera	Cyclorhapha	
	Hexapoda	Insecta	Pterygota	Diptera	Brachycera	
	Hexapoda	Insecta	Pterygota	Hymenoptera		
	Hexapoda	Insecta		Dermoptera	Forficulina	
Hexapoda	Insecta	Pterygota	Dictyoptera	Blattaria	Blattidae	
Myriapoda	Chilopoda		Geophilomorpha		Geophilidae	
Myriapoda	Diplopoda					
Arachnomorpha	Arachnida	Acari	Acarina			
	Chelicerata	Arachnida	Pseudoscorpiones			
Mollusca		Gastropoda	Pulmonata	Stylommatophora		