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OCCURRENCE OF SOME COLLEMBOLAN SPECIES IN PEDO-ECOSYSTEM

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Abstract: *In all over the world more than 8000 species of collembola are known. Local biodiversity of Collembola can be very high, reaching over 100 species in small mountain ranges. Indian fauna of Collembola represents only 299 species in 103 genera under 19 families. There are so many checklists and catalogues are available on Collembola from minor territories and whole continents. During the investigation period the predominant species of collembola found in pedo-ecosystem are mainly Isotomurus unifasciatus, I. fucicola, Proisotoma ripicola, Isotoma (Desoria) trispinata, Hypogastrura sonapani, H. viatica, H. baltica, Lepidocyrtus agraensis, L. paradoxus, L. violaceous, L. fimetarius, L. lignorum, L. curvicollis, Sinela curviseta, Cyphoderus albinus, Neelus murinus, Sphaeridia pumilis, and Folsomia santokhi. Whereas less abundant species are Appendisotoma abiskoensis, Cryptopygus tridentatus, Isotomurus antennalis.*

Key words: *Biodiversity, Collembola, Important role, Pedo-ecosystem, Species*

Introduction: Collembola are surface dwelling as well as found two to three centimeters below the surface. They live in wet and dry ecosystems and cosmopolitan in distribution. The densities of these micro-arthropods are in millions per square meter. In all over the world more than 8000 species of collembola are known [1]. Although has done much effort to cataloging of collembola of world but there were so many un-described species still present in the environment [1]. Local biodiversity of Collembola can be very high, reaching over 100 species in small mountain ranges. Indian fauna of Collembola represents only 299 species in 103 genera under 19 families [2]. There are so many checklists and catalogues are available on Collembola from minor territories and whole continents. The literatures available on these are huge but the species described till date are very rare. The most serious problems for a global bio-geographical analysis are the lack of enough records from entire territories of the global continents. Collembola have well differentiated feeding category and life-forms which facilitate the important role that Collembola play in ecosystems to be recognizing in several extent. Collembola play much significant role in plant litter decomposition processes and in forming soil microstructure. Collembolans mostly feed on plant litter, live plant tissue, some plant pathogens, fungi, bacteria, actinomycetes, algae and reduce the growth of moulds. They maintain balance between bacteria and fungi in the soil and contribute to soil microstructures by adding their feacal pellets [3]. Global change in climate, environmental factors and nitrogenous fertilizer impact to soil and intensive agricultural methods have great influence on collembolan biodiversity. The ecological literature has been reviewed [4, 5, 6, 7], but there are a lot of over views regarding the role of springtails in ecosystems. As explained that the collembola only fungivores in the food web of soil [8]. It is necessary to describe the current state of knowledge for the functional role that Collembola play in ecosystems and by which process they linked functionally to other groups of organisms in soil. Clearly there is a great need and many opportunities for additional research on these environmentally important organisms in India. The great diversity of Collembola species in India is largely unknown and it is only through constant, devoted, careful research, such as that represented in the research work. The biological diversity should be re-documented for better

understanding of the neoteric world Collembolan fauna.

Materials and Methods

Study Sites and Collection of Collembola: Samples were collected from December, 2010 to March, 2014. The main areas were Varanasi, Gopiganj, Chandauli, Jaunpur, Sant Ravidas Nagar (Bhadohi), Mirjapur, Anpara and Sonbhadra etc.

Extraction Method: Whatever samples collected were extracted by using modified Tullgrain's funnel. on the same day and it was continued up to till 24 hrs, depending upon the densities of fauna present in the respective samples for the extractions of collembolan. The initial 12 hours were given less heat and light (40 W and 110 V) and it was increased (40 W and 220 V) light intensity for full extraction of collembolans.

Sorting and Preservations: The specimens were sorted and segregated out under zoom stereomicroscope from vials. Subsequently, they were preserved in 70% alcohol with few drops of glycerol. For identification the specimens were mounted on slides in Hoyer's medium. The digital photographs were taken through Lieca DM 1000 microscope fitted with Leica DFC 290 camera.

The possible efforts were made to identify collembolan population. The individuals were initially identified using available taxonomic keys [9, 10, 11]. Their identification was subsequently confirmed by expert scientist of Zoological survey of India, Kolkata (Dr. A.K. Hazra and G.P. Mandal).

Results and Discussion

Important component of soil mesofauna is Collembola and mites found at most all terrestrial area. Collembolans are the keystone group of decomposers in the below ground food web of ecosystems [12]. The important role of collembola is in soil genesis, dynamics as well as evolution. They show their prompt response to environmental variations and causes continuous atrophic modifications. Collembola play much significant role in plant litter decomposition processes and in forming soil microstructure. Collembolans mostly feed on plant litter, live plant tissue, some plant pathogens, fungi, bacteria, actinomycetes, algae and reduce the growth of moulds. They maintain balance between bacteria and fungi in the soil and contribute to soil microstructures by adding their feacal pellets. Global change in climate, environmental factors, nitrogenous fertilizer impact to soil and intensive agricultural methods have great influence on collembolan biodiversity. These are very useful bio-indicators [13] as they play major role in de-forestation and burning. As these are very useful creature it is necessary to detail study of these minute organisms. In all over the world more than 8000 species of collembola are known. Local biodiversity of Collembola can be very high, reaching over 100 species in small mountain ranges. Indian fauna of Collembola represents only 299 species in 103 genera under 19 families [2]. There are so many checklists and catalogues are available on Collembola from minor territories and whole continents. The most serious problems for a global bio-geographical analysis are the lack of enough records from entire territories of the global continents. Collembola have well differentiated feeding category and life-forms which facilitate the important role that Collembola play in ecosystems to be recognizing in several extent. During the investigation period the predominant species of collembola found in pedo-ecosystem are mainly *Isotomurus unifasciatus, I. fucicola, Proisotoma ripicola, Isotoma (Desoria) trispinata, Hypogastrura sonapani, H. viatica, H. baltica, Lepidocyrtus agraensis, L. paradoxus, L. violaceous, L. fimetarius, L. lignorum, L. curvicollis, Sinela curviseta, Cyphoderus albinus, Neelus murinus, Sphaeridia pumilis,* and *Folsomia santokhi.* Whereas less abundant species are *Appendisotoma abiskoensis, Cryptopygus tridentatus, Isotomurus antennalis.*

Table – 1: Species of collembola recorded from Varanasi and nearby stations:

Sub-Order	Section/ Super family	Family	Sub-Family	Genus	Species
Arthropleona	Poduromorpha	Hypogastruridae	Hypogastrurinae	*Hypogastrura*	*H. Sonapani*
					H. Viatica
					H. baltica
	Entomobryomorpha	Isotomidae	--	*Folsomia*	*F. santokhi*
				Folsomides	*Folsomides* sp.
				Cryptopygus	*C. tridentatus*
			Proisotominae	*Proisotoma*	*P. ripicola*
			--	*Isotomurus*	*I. unifasciatus*
					I. fucicola
					I. antennelis

		Isotominae	*Isotoma* (*Desoria)*	*I.(Desoria) trispinata*
	Entomobryidae	Entomobryinae	*Sinella*	*S. curviseta*
			Seira	*Seira* sp.
			Entomobrya	*Entomobrya* sp.
			Lepidocyrtus	*L. agraensis*
				L. paradoxus
				L. violaceous
				L. fimetarius
				L. curvicollis
				L. lignorum
	Paronellidae	Paronellinae	*Salina*	*Salina* sp.
	Cyphoderidae	Cyphoderinae	*Cyphoderus*	*C. albinus*
Symphypleona	Neelidae	--	*Neelus*	*N. murinus*
	Sminthurididae	--	*Sphaeridia*	*S. pumilis*
			Sminthurides	*Sminthurides* sp.
	Katiannidae	--	*Sminthurinus*	*Sminthurinus* sp.

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