



**PRELIMINARY STUDY ON COLLEMBOLA IN DIFFERENT HABITATS OF PAKHAL  
WILDLIFE SANCTUARY, WARANGAL**

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**ABSTRACT**

Collembolans were collected by Tullgren funnel method from forest floor soil for a period one year in two habitats was reported. The habitats have different types of vegetations, Natural Forest area and Teak Plantation area of Pakhal wildlife sanctuary, Warangal. 7 species were identified from 5 families in both areas. Out of 5780 collembolans 58.73 % in natural forest and 41, 26% percentage in teak plantation area was recorded. Among the total population poduridae was absent in teak plantation area. The species composition and qualitative and quantitative study was analyzed with statistical data.

**KEYWORDS:** Collembola, Pakhal wild life sanctuary, natural forest area, Teak Plantation area.

**INTRODUCTION**

Collembolans are the primitive Apterygote (wingless) insects. They are called “Springtails” because most of them have a spring like lever or furcula. They are omnivorous free living organisms that prefer moist conditions and are soil and litter dwelling animals. Collembola are small, wingless arthropods measures about 6 mm long. They resemble insect by having a distinct head with one pair of segmented antennae, three segmented thorax with 3 pairs of legs. Hopkin, Stephen P. (1997) strongly pointed that they do not directly engage in the decomposition of organic matter but contribute to it indirectly through the fragmentation of organic matter and the control of soil microbial communities. Deep mala et.al. (2015) determined the population abundance of collembola was higher than mites in Indian soil. A Collembolla population density change depends on physical and climatic conditions of an area (H. A. Verhorf,1983). D.Paul (2011) studied on collembolan population variations in forest and agroecosystem of Shillong. The present study deals with qualitative and quantitative composition of collembolan in forest soil at Pakhal wildlife sanctuary.

**MATERIAL AND METHODS**

The Tullgren funnel is used to extract soil inhabiting collembolans from samples of soil collected from two sites and brought to the lab. The sample is placed in a funnel above a perforated disc and the whole apparatus placed under a low-powered electric light bulb. The rise in temperature and the drying effect encourage the animals to move away from the source of heat, downwards through the holes in the perforated disc, into

the funnel and so to the collecting vessel underneath. Leave the funnel for at least 2-3 days. After these extracted material were identified under the Stereo binocular microscope and data analyzed.

**RESULTS AND DISCUSSION**

The collembolan (Table-1) were recorded both qualitatively and quantitatively maximum in natural forest area followed by teak plantation area. This may be due to the accumulation of leaf litter and other plant parts in the soil system. 7 species were recorded in both habitats. However, poduridae was absent in teak plantation area. In natural forest area *Entomobrya sp* was recorded maximum number 25.64% followed by *Lepidocytrus sp* 13.80%, *Isotoma tripsinata* 5.88%, *Bourletiella sp* 5.22%, *Onychiurous sp* 2.82%, *Pseudosinella sp* 0.83% and *Produra aquatica* 0.43% were recorded in minimum number. In teak plantation area *Lepidocytrus sp* was recorded maximum number individuals 12.59% followed by *Entomobrya sp* 12.19%, *Isotoma tripsinata* 5.03%, *Bourletiella sp* 3.54%, *Onychiurous sp* 1.76%, *Pseudosinella sp* 0.58 % were recorded respectively. *Produra aquatica* was not recorded in teak plantation area. Table -2 showed that their population abundance was more with  $44.9 \pm 5.48$  in monsoon followed by winter  $29.7 \pm 5.47$  and summer  $8.7 \pm 1.94$  in forest area. In summer season their number was very low represented as  $2.8 \pm 0.056$  in the month of April. Table -3 showed the population abundance of collembolan in teak plantation area in monsoon maximum number was recorded in June  $31.5 \pm 4.08$  followed by winter  $16.0 \pm 1.63$  in October and summer  $0.03 \pm 0.09$  in May respectively.

**Table 1: Total number of collembolans during the study period in Natural forest and Teak plantation area during the study period.**

Arthropod taxa	Natural forest area	%	Teak plantation area	%
Collembolla	3395	58.73	2385	41.26
<b>Isotomidae</b>				
Isotoma tripsinata	340	5.88	291	5.03
<b>Entomabryidae</b>				
Entomobrya sp	1482	25.64	705	12.19
Pseudosinella sp	48	0.83	34	0.58
Lepidocytrus sp	798	13.80	728	12.59
<b>Onychiuridae</b>				
Onychiurus sp	163	2.82	102	1.76
<b>Sminthuridae</b>				
Bourletiella sp	302	5.22	205	3.54
<b>Poduridae</b>				
produra aquatica	25	0.43	Nil	-
<b>Simpsons Index</b>		<b>0.53</b>		<b>0.75</b>

**Table 2: Relative population abundance of Collembola in the Natural Forest Area during the study period.**

Season	Month	Population abundance
Monsoon	June	<b>44.9 ± 5.46</b>
	July	39.1 ± 4.26
	August	27.4 ± 4.13
	September	11.6 ± 3.90
Winter	October	29.7 ± 5.47
	November	6.0 ± 0.75
	December	8.4 ± 0.40
	January	10.2 ± 0.96
Summer	February	8.7 ± 1.94
	March	3.6 ± 0.24
	April	<b>2.8 ± 0.56</b>
	May	4.0 ± 0.90

**Table 3: Relative population abundance of Collembola into plantation area during the study period.**

Season	Month	Population abundance
Monsoon	June	<b>31.5 ± 4.08</b>
	July	25 ± 0.29
	August	17 ± 1.24
	September	6.0 ± 0.92
Winter	October	16.0 ± 1.63
	November	4.5 ± 0.96
	December	6.7 ± 1.46
	January	8.5 ± 1.02
Summer	February	-
	March	-
	April	2.7 ± 0.56
	May	0.3 ± 0.09

In summer season their number was not recorded in March and April.

The total Collembola in natural forest area were recorded more in number when compared to teak plantation area. It is due to more litter in the natural forest area. Availability of more amounts of food materials in natural forest area is the reason for the abundance of Collembola (Reddy and Venkataiah, 1990). Huff Mann and Harding (1986) recorded more number in 3 forest habitats and recorded that mixed low land forest area are the most suitable for Collembola. The total soil invertebrates were also recorded in more densities in natural forest area when compared to teak plantation. The more number indicated that relative complexity and stability of the natural forest area over the teak plantation area being simple, fragile and less complex. Odum (1971) reported that the higher density means the longer food chains and more causes of population interaction, which may be true for the present case that the natural forest area harbor more species than teak plantation area.

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#### REFERENCES

1. Deepmala and Rajesh Yadav; Biodiversity of springtail in Kanpur district of Uttar Pradesh., *Int. Arch. App. Sci. Technol.*, December, 2015; 6(4): 19-20.
2. H. A. Verhorf and A. J. van. Selm, "Distribution and Population Dynamics of Collembola in Relation to Soil Moisture," *Holarctic Ecology*, 1983; 6: 378-394.
3. Hopkin, Stephen P. Biology of the springtails (Insects: Collembola) Oxford, Oxford University Press, 1997.
4. Huffman, R.R. and Harding, J.A Pit fall collected insects from various love Raio Grande valley habitats. *South Western Entamol.*, 1980; 5(1): 33-46.
5. Odum, E.P. Fundamentals of ecology (3<sup>rd</sup>edn), W.B. sunders comp, Philadelphia, 1971.

6. Reddy. M.V. and Venkataiah, B. seasonal abundance of soil – surface arthropods in relation to some meteorological and edaphic variable of grassland and tree planted areas in a tropical semi-arid savanna. Intern. J. Biometerol, 1990; 34: 49-59.