

## COLLEMBOLAN SPECIES IN GRASSLAND AREA OF JHANSI REGION

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**ABSTRACT:** The structure and ecology of Collembolan are investigated in different habitats of Jhansi during June 2013-October 2013. The aim is depending on the results of the investigation to establish a separate local nature conservation and recreation area. The study areas consist of different habitats, which differ from each other in the composition of the vegetation and the water regime of soils. Collembolans are collected from the selected sampling sites using mainly two different methods: 1) Separating collembolans with the Berlese method from soil and the leaf litter. 2) The majority of the Collembolans are collecting using Pitfall traps. Collembolan species diversity are highest in the moist soil, and the lowest on the fresh water. The community structures of collembolans in different habitats are compared. The species composition clearly reflected the microclimatic characters of the individual habitats. The study area as a less polluted natural environment can be considerable available for selection a conservation territory. It seems to be especially important to protect this particular mosaic like habitats for sustaining their high animal taxonomic and functional biodiversity.

**KEYWORDS:** Biodiversity, Collembolans

### INTRODUCTION

Collembolans are wingless, primitive insects, minute in size, elongated or globular, with long and short antennae and 6 segmented abdomens, first segment with a forked springing organ, for which they are popularly known as "Springtails". Order Collembola is widely distributed and highly abundant group of entognathous wingless hexapods ([Hopkin, 1997](#)). The majority of Collembolan inhabits moist, terrestrial habitats such as damp leaf litter, yet a small percentage is considerable to be semi aquatic or riparian ([Thorp and Covich, 1981](#)). Among soil arthropods fauna, soil mites and Collembolans are know to dominate the Indian soil (70-97%) and indicate the status of soil health and fertility ([Veeresh, 1983](#)). Adequate knowledge of spatial pattern and seasonal population buildup of such fauna is considered desirable for understanding their ecology and role in decomposition process in major land use system of a region for understanding the sustainability issues ([Badejo et al., 1997](#)).

### MATERIALS AND METHODS

#### 2.1. Study Site Description

The study was carried at Jhansi (25° 27' N latitude and 78° 35' E longitude and about 275 m above mean sea level) during June 2013-October 2013, during this period the average annual rainfall was 900 mm, over 70 percent rain received during July to September. May was the hottest month with mean maximum

temperature of 41.3°C. January was the coldest month with mean minimum temperature of 5-6°C.

#### 2.2. Soil

The soil of this area is red with patches of red and black mixed soil, with semi-rocky substratum at place. Its texture is sandy clay loam to sandy clay and its nutrients status low to medium. The grassland vegetation consisted of a mixed stand having five major perennial grass species viz., *Cenchrus ciliaris* Linn., *Chrysopogon fulvus* (Spreng) plantation (2500 trees) was over 15 years of age.

#### 2.3. Methods

Collembolans are collecting two different methods 1) The majority of Collembolans are collecting pitfall traps and put at 4 different habitats. A) I area: Moist Soil. B) II area: Decompose vegetable matter. C) III area: Under the bark of tree. D) IV area: Still water. 2) Separating animals use Berlese methods.

### RESULTS AND DISCUSSION

Nearly 688 specimens of 34 Collembolan species are collected from the study areas. The richest families were Entomobryidae, Hypogastruridae and Isotomidae. Study area I proved to be the most diverse one. Collembolan species highest in study area I and lowest in study area II. The largest similarity is seen between I, III, IV area. The largest difference turned out to be between

study area I and II area. Collembolans are represented numerously in soils of forest ecosystems. Agrocoenoses, can support similar or slightly lower densities of springtails than natural ecosystems situated on the same type of

soil. Increasing intensity of management, using of pest control chemicals, herbicides and large doses of mineral fertilizers drastically reduce Collembolan densities in the field soil (Table 1).

**Table 1:** Collembolan species collected from Jhansi Region

S.No	Species	Study area				Total
		I	II	III	IV	
I	Family Hypogastruridae	114	2	86	56	258
1	<i>Hypogastrura denticulate</i> (Begnall)	80	-	68	25	172
2	<i>Hypogastrura luteospina</i> Stach	-	-	-	5	5
3	<i>Hypogastrura vernalis</i> (Carl)	6	-	-	12	18
4	<i>Xelnulla maritime</i> Tullberg	-	-	-	-	-
5	<i>Friesea mirabilis</i> (Tullberg)	12	-	18	15	45
6	<i>Anurida tullbergi</i> Schott	5	-	-	-	5
7	<i>Neanura conjuncta</i> (Stach)	11	-	-	-	13
II	Family Isotomidae	69	11	22	36	138
1	<i>Folsomia nana</i> Gisin	22	6	12	10	50
2	<i>Folsomia candida</i> (Willem)	7	-	2	5	14
3	<i>Isotomiella minor</i> (Schaffer)	-	-	3	-	3
4	<i>Isotomina bipunctata</i> Axelson	10	3	-	7	20
5	<i>Proisotoma crassicauda</i> (Tullberg)	13	-	-	3	16
6	<i>Proisotoma minuta</i> (Tullberg)	5	2	-	8	15
7	<i>Isotoma notabilis</i> (Schaffer)	12	-	5	3	20
III	Family Tomoceridae	23	-	10	15	48
1	<i>Tomocerus vulgaris</i> (Tullberg)	23	-	10	15	48
IV	Family Entomobryidae	131	4	22	36	193
1	<i>Entomobrya handschini</i> Stach	6	4	5	6	17
2	<i>Entomobrya lanuginosa</i> (Nicolet)	16	-	3	8	27
3	<i>Entomobrya marginata</i> (Tullberg)	33	-	8	3	48
4	<i>Entomobrya multifasciata</i> (Tullberg)	20	-	-	-	20
5	<i>Orchesella flavescens</i> (Bourlet)	5	-	-	-	5
6	<i>Orchesella cincta</i> (Nicolet)	-	-	-	2	2
7	<i>Pseudosinella wahlgreni</i> (Borner)	-	-	-	5	5
8	<i>heteromurus nitidus</i> (Templeton)	5	-	6	10	21
9	<i>Lepidocyrtus lanuginosus</i> (Gmelin)	23	-	-	-	23
10	<i>Lepidocyrtus cyaneus</i> Tullberg	20	-	-	2	22
11	<i>Lepidocyrtus paradoxus</i> Uzel	13	-	-	-	13
V	Family Sminthuridae	10	34	-	7	51
1	<i>Sminthurides aquaticus</i> (Bourlet)	-	3	-	-	3
2	<i>Sminthurides pumilis</i> (Krausbayer)	2	-	-	-	2
3	<i>Sminthurides malmgreni</i> (tullbergi)	3	2	-	-	5
4	<i>Bourletiella insignis</i> (Reuter)	-	15	-	5	20
5	<i>Sminthurus lubbocki</i> Tullberg	3	1	-	1	4
6	<i>Dicyrtoma fausa</i> (Lucas)	-	8	-	-	8
7	<i>Dicyrtoma ornate</i> (Nicolet)	-	5	-	-	5
8	<i>Neelus minimus</i> (Willem)	2	-	-	1	3

### CONCLUSION

The results of our investigation proved that the most important environmental factors of Collembolan species are the vegetation of the area; the family of Sminthuridae mostly lives on the surface of still water (II area).

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