

Original Research Article

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## A Preliminary Report of Collembola (Arthropoda: Collembola) from Northern Hill Region of Chhattisgarh, India

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### ABSTRACT

#### Keywords

Arthropoda, Collembola, Chhattisgarh, First record, Ranghagh, Preliminary

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The present study was made to assess the Collembola fauna of the Northern Hill Region of Chhattisgarh, India. The 12 species from 10 genera of epigeic collembola were recorded from two different habitats of the region and 8 genera namely *Seira*, *Entomobrya*, *Homidia*, *Lepidocyrtus*, *Sinella*, *Yossia*, *Pseudosalina* and *Salina* were firstly recorded from the Chhattisgarh. They are rich in organic soil and leaf litters. Subfamily Lepidocyrtinae (*Lepidocyrtus*) was dominating group whereas subfamily Paronellinae was the diverse subfamily over all during the whole survey.

### Introduction

The collembolans (springtails) are micro Soil Arthropods and the most abundant apterygote insect in the soil and constitute an important component of soil mesofauna in almost all type of ecosystems. There are about 8279 described species of collembola worldwide, (Belinger *et al.*, 2016). In case of Indian Collembola represent 342 species in 113 genera under 20 different families (Mandal 2018). They found in wet areas as well as in dry ecosystems from arctic and alpine tundra to deserts and tropical rain forests. Collembola are beneficial to the health of soil and are generally 1-3 mm long in size. The majority of

springtails feed on various fungal hyphae or decaying plant material (organic material). Such activities are vital in the functioning of ecosystems and maintaining of soil health and above ground productivity, both in natural i.e. forest and human altered (agricultural) ecosystem.

The literatures are very silent regarding collembolan reports from the Chhattisgarh of India. The State Chhattisgarh contributed very negligible number of Collembola fauna i.e. only 6 species for Indian Collembola heritage (Mandal, 2018). The study of various aspects of collembolan ecology and diversity in Surguja district of Chhattisgarh is initiated.

The aim of present study was to observe the diversity of springtails in different habitat of Northern Hill Region of Chhattisgarh.

## Materials and Methods

The present study was carried out at two locations of the Northern Hill Region of Chhattisgarh namely, Litchi Orchard of IGKV- Rajmohini Devi College of Agricultural and Research Station, Ambikapur and Ranghagh forest Nursery in Chendra village of Surguja District of Chhattisgarh. The Litchi orchard of IGKV- Rajmohini Devi College of Agricultural and Research Station, Ambikapur is situated at 623 Mtr. above the mean sea level and lies at 23.10<sup>0</sup> N latitude and 83.15<sup>0</sup> E longitudes, whereas Ranghagh forest nursery is situated at 23.0658<sup>0</sup> N Latitude and 83.3228<sup>0</sup> E Longitude respectively (Fig. 1). The average temperature and rainfall of region are 23.90<sup>0</sup> Celsius and 1358.30 mm annually respectively.

The Litchi Orchard (site-I) was heavily littered (but not fully decomposed) which was wetted by seepage of regular irrigation channel. More or less same situation was also at Ranghagh Forest Nursery, but in Ranghagh nursery litters were moistened by regular flow of fall water and soil was stony with litter fall. The Collembola were collected during month of March 2018 at morning hours (06 AM to 08 AM) through the aspirator (Fig. 2). The collection methods were followed to Yadav (2017a) and Yadav *et al.*, (2018a). The collected materials were frequently transferred to the vial containing 60% alcohol. Soil litters were also carried for extraction of Collembolans in the laboratory through Tullgren Funnel method (Tullgren, 1918) (Fig. 3). These collected Collembola were also transfer into vial containing 70% of alcohol.

All the collected materials were shorted out under stereo zoom microscope (CZM6) and Labovision (AXL) in the laboratory. The final

identification was made by temporary slide preparation method with the help of standard keys of Christiansen and Bellinger (1992), Hazra (2015) and Yadav *et al.*, (2018b).

## Results and Discussion

A total of 560 individuals of epigeic Collembola of 12 species from 10 genera were identified from 4 different subfamilies from two sites of Northern Hill Region of Chhattisgarh after intensive surveys during March 2018 (Table 1) and Figure 4 and 5. The subfamily wise distribution of epigeic Collembola are given in Figure 5 of the both sites of this region of Chhattisgarh. The Collembola fauna of the subfamily Lepidocyrtinae was dominated at the both sites over all in respect of population abundance while Paronellinae (6 spp) was diverse subfamily in respect of generic compositions followed by Lepidocyrtinae (3) and Entmobryinae (2sp) and Seirinae with only 1 genera.

The population abundance at generic level was also recorded during the survey. The highest population was recorded as *Lepidocyrtus sp2* (16%) followed by *Lepidocyrtus sp1* (15%) *Entomobrya sp.* (11%), *Sinella sp.* and *Yossia sp.* (10% each), *Salina indica* (9%), *Callyntrura sp1* (7%), *Dicranocentroides indica* (6%), *Callyntrura sp2* (5), *Pseudosalina sp* and *Homidia sp* (4% each) and *Seira sp* (3%) were recorded during the study (Fig. 6).

In Indian checklist of Collembola, state of Chhattisgarh added only 6 species till date (Mandal, 2018). The present study contributed 12 species of 10 genera namely *Seira*, *Entomobrya*, *Homidia*, *Lepidocyrtus*, *Sinella*, *Dicranocentroides*, *Callyntrura*, *Yossia*, *Pseudosalina* & *Salina*. Yadav (2017a), Raghuraman *et al.*, (2010), Yadav *et al.*, (2018a), Yadav (2017b), Yadav and Singh

(2009) and Yadav (2017c) have recorded very considerable number of the Collembola fauna from the adjoining province to the Chhattisgarh. In these record 8 genera are firstly recorded from the state whereas Mandal

(2018) listed 6 species from two genera namely *Callyntrura* and *Dicranocentroides*. The study reveals that this region has also two endemic species of Collembola viz. *D. Indica* and *S. Indica*.

**Table.1** Checklist of epigeic Collembola of Northern Hill Region of Chhattisgarh, India

S.N.	Texa	RMDCARS (Litchi Orchard) (Site I)	Ranghagh Forest Nursery (Site II)
1.	<b>Seirinae</b> <i>Seira</i> sp	+	++
2.	<b>Entomobryinae</b> <i>Entomobrya</i> sp <i>Homidia</i> sp	+ -	+++ ++
3.	<b>Lepidocyrtinae</b> <i>Lepidocyrtus</i> sp 1 <i>Lepidocyrtus</i> sp 2 <i>Sinella</i> sp	+ + +	+++ ++ -
4.	<b>Paronallinae:</b> <i>Dicranocentroides indica</i> <i>Yossia</i> sp <i>Callyntrura</i> sp 1 <i>Callyntrura</i> sp 2 <i>Pseudosalina</i> sp. <i>Salina indica</i>	+ - - - - + -	- ++ +++ ++ + + ++

**Fig.1** Habitat of Survey Site (Site I Above and Site II below)





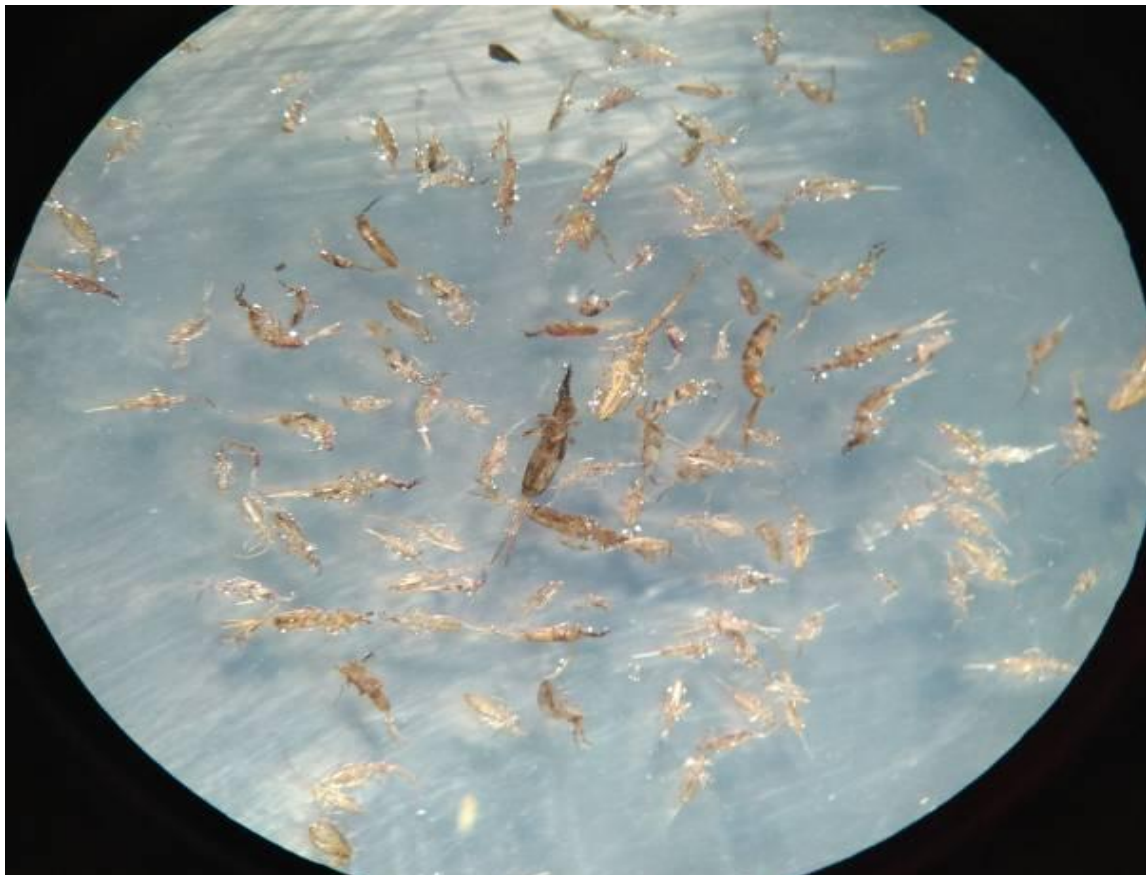
**Fig.2** Collection of Fauna



**Fig.3** Extraction of leaf litter



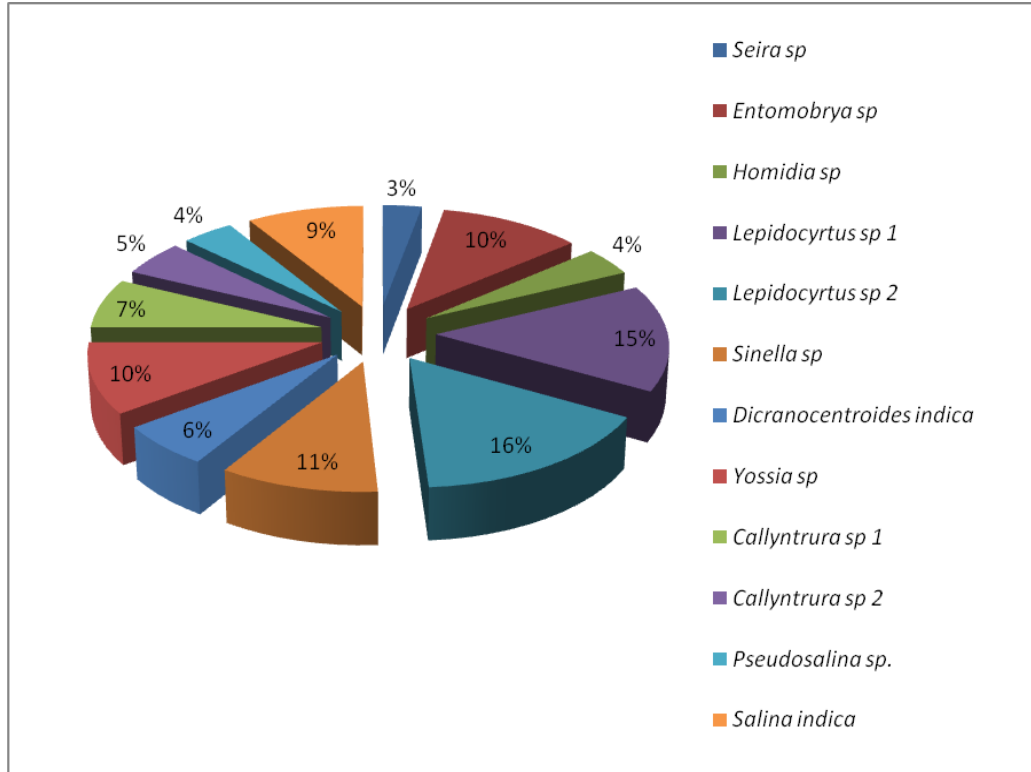
**Fig.4** Biodiversity of the Collembola fauna



**Fig.5** A. *Entomobrya*, B. *Salina*, C. *Seira*, D. *Callyntrura* I, E. *Callyntrura* II, F. *Homidia* G. *Yossia*



**Fig.6** Population abundance of Collembola at NHR of Chhattisgarh



If site wise comparison seen, the site-I has lesser number of collembolan as compare to site-II. It is mainly due to more organic matter contents and moisture in the litter and soil of site-II. Yadav *et al.*, (2018c), Detsis (2000) and Christiansen and Bellinger (1980) have also recorded that organic horizon contains more number of Collembola in the India and abroad.

Family Entomobryidae (subfamily Entomobryinae and Lepidocyrtinae) and Paronellidae (subfamily Paronellinae) are the first and second dominating family group respectively while rests are lesser. Yadav (2017b) and Raghuraman *et al.*, (2010) and Yadav *et al.*, (2018a) also reported somewhat similar trend from the country. Family Paronellidae (subfamily Paronellinae) contributed higher number of individuals from Northern hill region of Chhattisgarh whereas (Yadav *et al.*, 2018a) recorded

Entomobryidae from W.B., India genus *Lepidocyrtus*, was dominating over the all (Yadav, 2017a), Raghuraman *et al.*, (2010) and Mandal (2014).

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