

**FIRST RECORD OF COLLEMBOLA (HEXAPODA) FROM CHHATTISGARH, INDIA*****G.P. MANDAL AND K.K. SUMAN***Zoological Survey of India, M-Block, New Alipore, Kolkata 700053, India**corresponding author e-mail: gpmandal.zsi@gmail.com.**INTRODUCTION**

The collembolans commonly called “spring-tails” are small, entognathous, wingless hexapods possessing a spring-like forked jumping organ, the furcula underneath the fourth abdominal segment. They are minute in size (less than 6 mm in length); antennae primarily with 4 segments. The presence of antennae and absence of cerci distinguish them from the other entognathous hexapods. The collembolans have very diverse distribution occurring in all Zoo-geographical regions of the world inhabiting a wide range of ecological niche and climate. They are prevalent in almost all kind of situations, in mosses, under stones, caves, in ant and termite nests, surface of lakes and ponds even in the intertidal zone. The greatest diversity and density are seen in soil rich organic matter. There are about 8500 species described worldwide (Janessens, F. 2016). Indian fauna of Collembola represented by 311 species in 103 genera under 19 families (Mandal, 2010).

The present communication is based on collection made from CAMPA project of Zoological Survey of India, Kolkata during March, 2014 to April, 2014, covering Korba, Koriya, Jashpur and Kabirdham districts of Chhattisgarh State. Altogether five species of Collembola belonging to two genera under the family Paronellidae have been recorded. Diagnosis and distribution of Collembola from Chhattisgarh are also provided. There is no previous record of Collembola fauna from Chhattisgarh state and this is the first report of Collembola from the state.

Chhattisgarh is a state in central India., lies between 21.2700° N Latitude and 81.6000° E

Longitude with an area of 135,194 sq km. The northern and southern parts of the state are hilly, while the central part is a fertile plain. The highest point in the state is the Bailadila Range. Deciduous forests of the Eastern Highlands Forests cover roughly 44% of the state. In the north lies the edge of the great Indo-Gangetic plain. The Rihand River, a tributary of the Ganges, drains this area. The eastern end of the Satpura Range and the western edge of the Chota Nagpur Plateau form an east-west belt of hills that divide the Mahanadi Riverbasin from the Indo-Gangetic plain.

MATERIALS AND METHODS

A white enamel tray and aspirator were used for collection of collembola. An amount of alcohol was used in the tray or the large petridish during beating the bushes, mosses or forest litters for collections of collembolan specimens in order to induce the insects to jump on these objects. Thereafter, they were picked up with fine brush and preserved in 70% alcohol. Specimens were mounted under a cover slip in Hoyer's solution, and were studied under a Leica Digital Module (DM 2500) microscope. Photographs were taken under a Leica Digital Module R (DMR) microscope using a mounted Leica DFC 295 digital camera, and were enhanced with Photoshop CS4 (Adobe Inc.). All specimens are deposited in the Apterygota Section, Zoological Survey of India (ZSI), Kolkata.

Hoyer's mounting medium was used for slide-mounting of the specimens. Identification of specimen is done using a phase contrast compound microscope following Christiansen and Bellinger (1998).

SYSTEMATIC LIST

Family PARONELLIDAE Börner, 1913

Subfamily PARONELLINAE Börner, 1913
sensu Soto-Adams F.N *et. al.*, 2008

Genus *Dicranocentroides* Imms, 1912

1. *Dicranocentroides indica* (Handschin, 1929)
Genus *Callyntrura* Börner, 1906
2. *Callyntrura (Handschinphysa) lineata*
(Parona, 1892) Yosii, 1959
3. *Callyntrura (Handschinphysa) vestita*
(Handschin, 1925)
4. *Callyntrura (Handschinphysa) longicornis*
(Oudemans, 1890)
5. *Callyntrura (Callyntrura) zaheri* Mitra, 1974

SYSTEMATIC ACCOUNT

Family PARONELLIDAE Börner, 1913

Subfamily PARONELLINAE Börner, 1913
sensu Soto- Adams F.N *et. al.*, 2008

Members of this subfamily may be distinguished from other entomobryids by the straight unringed dentes, without spines but with a terminal bladder like projection. The mucro is short and blunt and quite different from that of other entomobryids.

Genus *Dicranocentroides* Imms

1912. *Dicranocentroides* Imms, *Proc. Zool. Soc. London*: 80-125

1. *Dicranocentroides indica* (Handschin, 1929)
(Image 1)

1929. *Aphysa indica* Handschin, *Rev. Suisse, Zool.*, **36**: 221-262.

1975. *Dicranocentroides indica* (Handschin) Mitra, *Rec. zool. Surv. India.*, **71**: 57-95.



Dicranocentroides indica (Handschin, 1929)

Material examined: Chhattisgarh: Korba district, Tharpakhna Nala, Lemru range, 25.iii.2014, coll. Kailash Chandra, 1ex., Registration No.1723/H14.

Diagnosis: Coloration: Head and body brown colour with faint purple blue pigment. Antennal segments I, II, and III with a distinct distal bluish ring, IV mostly with blue pigment. Legs with dark brown pigment; furca with diffused blue pigment. *Clothing*: Body clothed with scales, cervix and anterior margin of thoracic segment II with a 'Collar' of acuminate setae; macrachaetae obliquely truncated thoracic II, III and abdominal segments I, II and III; segments IV, V and VI with acuminate setae at the posteriomedial part. *Head*: with two dark ocellar fields, each having 8 ocelli in two longitudinal parallel rows. Antennal segments I and II stouter; ratio of length of antennal segments. I -IV 17:19:13:25; segment IV superficially annulated, apical sense knobs not distinct. *Thorax*: Relative length index of thoracic segments II: III =12:9. Legs similar; unguis with paired basal and medial unpaired teeth, unguiculus lanceolate; tenent hair long, narrow and clavate. *Abdomen*: Relative length index of abdominal segments .I; II; II: IV: V: VI = 6:6:3:29:3:1; Ventral tube long with protrusible vesicle retracted. Manubrium: mucrodens 22:35, mucro short, quadrangular with six striated teeth.

Distribution: INDIA: Chhattisgarh, Uttar Pradesh, Assam, Nagaland, Manipur, Meghalaya, Mizoram, West Bengal and Kerala.

Remarks: Handschin (1929) described the species in *Aphysa* from Europe. In course of revision of Indian fauna of collembola, Mitra (1975) transferred the generic status of the species to *Dicranocentroides* on the basis of characters of the genus present in the insects.

Genus *Callyntrura* Börner

1906. *Callyntrura* Börner, *Mitt. Naturhist. Mus. Hamburg.*, **23**: 147-188.

2. *Callyntrura (Handschinphysa) lineata*
(Parona, 1892)
(Image 2)

1892. *Entomobrya lineata* Parona, *Atti. Soc. Ital., Milano*, **34**: 132-135.

1912. *Paronella borneri* Imms, *Proc. Zool. Soc. London*, pp. 80-125, new synonymy.
1957. *Handschinphysa lineata* Salmon, *Acta. Zool. Cracov.*, **11**(14): 313-362.
1974. *Callyntrura (Handschinphysa) lineata* Mitra, *Rev. Ecol. Biol. Sol.* **11**(3): 397-439.



Callyntrura (Handschinphysa) lineata (Parona, 1892)

Material examined: Chhattisgarh: Korba district, Kodmuru, Bijakhar Nala, 27.iii.2014, coll. Kailash Chandra, 1 ex., Registration No. 1724/H14; Korba district, Tharpakhna Nala, Lemru range, 25.iii.2014, coll. Kailash Chandra, 1 ex., Registration No. 1725/H14.; Koriya district, Sonahat Forest Rest House campus, 19.iii.2014, coll. Kailash Chandra, 1 ex., Registration No. 1726/H14; Korba district, Bijakhar Nala, 27.iii.2014, coll. Kailash Chandra, 1 ex., Registration No. 1727/H14.

Diagnosis: Body pale yellow with variable purple to blue black pigment. Head, body and appendages clothed with setae and pseudo scales; Head pear shaped, frontal spines 4+4 present; ocelli, 8+8. Head /Ant I = 28/27; ratio of length of antennal segments I-IV 28:28:18:48; Relative length index of thoracic segments II: III: 52:22; unguis elongate, little curved, unguis with paired inner and 2 distal unpaired teeth; unguiculus lanceolate; tenent hair clavate; Manubrium: mucrodens 110:148; dentes stout; mucro plump with 6-9 teeth. Body length 2.5 – 4 mm.

Distribution: INDIA: Chhattisgarh, Jharkhand, Himachal Pradesh, Manipur, Tripura and Uttarakhand.

3. *Callyntrura (Handschinphysa) vestita* (Handschin, 1925) (Image 3)

1925. *Microphysa vestita* Handschin, *Treubia*, **6**: 225-270; 1928, *Treubia*, **10**: 225-270.
1957. *Handschinphysa vestita* Salmon, *Acta. Zool. Cracov.*, **11**(14): 313-362.
1974. *Callyntrura (Handschinphysa) vestita* Mitra, *Rev. Ecol. Biol. Sol.*, **11**(3): 397-439.



Callyntrura (Handschinphysa) vestita (Handschin, 1925)

Material examined: Chhattisgarh: Jashpur district, Badalkhol wild life sanctuary, 23.iii.2014, coll. Kailash Chandra, 1 ex., Registration No. 1728/H14.

Diagnosis: Unique in colour pattern and usually without any variation; body green in fresh, pale yellow in spirit. Body clothed with flexed macrochaetae, acuminate, nonflexed setae and scales. Head pear shaped with 4+4 dark frontal spines; ocelli 8+8. Antennae subequal or little longer than body, ratio of length of antennal segments I-IV 43:40:27:60. Relative length index of thoracic segments II: III 63:31; unguis straight, little curved apically with inner, paired basal teeth reduced, single unpaired tooth small; external baso-lateral teeth large; unguiculi lanceolate. Relative length index of abdominal segments I: II: III: IV: V: VI 18:31:14:172:22:9; Manubrium: mucrodens: 45:53; mucro usually with 6 teeth, dental scale appendages small. Body length 2-2.5 mm.

Distribution: INDIA: Chhattisgarh, Jharkhand, Maharashtra, Assam, Manipur, Meghalaya, Nagaland; *Elsewhere:* INDONESIA.

4. *Callyntrura (Handschinphysa) longicornis*
(Oudemans, 1890)
(Image 4)

1890. *Entomobrya longicornis* Oudemans, *Zool. Ergeb.* **1**: 73-91.
1911. *Campylothorax ceylonicus* Ritter, *Neue Thysanuren und Collembolen aus Ceylon und Bombay, gesammelt von Dr. Uzel. Ann. Naturhist. Hofmus. Wien* **24**: 379-398.
1957. *Handschinphysa longicornis* Salmon, *Acta. Zool. Cracov.* **2**(14): 313-363.



Callyntrura (Handschinphysa) longicornis
(Oudemans, 1890)

Material examined: Chhattisgarh: Kabirdham district, Chilpi, Bagbil, 01.iv.2014, coll. Kailash Chandra, 1 ex., Registration No. 1729/H14.

Diagnostic characters: Coloration: Yellowish to brown with blue black ocellar fields with a narrow edging to the thoracic and abdominal terga. Abdominal segments III and IV with lateral blue- black shading and V and VI each with ventro-lateral blue black pigment blotches. **Clothing:** Body with pointed scales except across the dorsal surface of the thorax and anterior part of the abdomen. **Body:** Antennae longer than the body; ratio of length of antennal segments I-IV 66:75:52:110, segment IV annulated. Body length, to 3.5 mm. **Legs:** Claw with two long outer pseudonychia reaching the level of the inner teeth. Legs with one distal tooth and a pair of basal teeth. **Furcula:** Manubrium: dens to mucro as 110:135: 718; dens with many spines like ciliated setae. Mucro with 7-9 teeth, one of them always with a lateral ridge and two subapical and two or three plate like teeth on the posterior face.

Distribution: Chhattisgarh, Assam and Sikkim.

Remarks: Salmon (1957) recorded this species from Gangtok, Sikkim, collected by T. Clay amongst dry and rotting leaves at Gangtok, 6000ft. (11.2.1952) the specimens of the study areas made during this investigation appear similar to those of Salmon (1957).

5. *Callyntrura (Callyntrura) zaheri* Mitra
(Image 5)

1974. *Callyntrura zaheri* Mitra, *Rev. Ecol. Biol. Sol.* **11**(3): 397-439.



Callyntrura (Callyntrura) zaheri Mitra

Material examined: Chhattisgarh: Kabirdham district, Chilpi, Bagbil, 01.iv.2014, coll. Kailash Chandra, 1 ex., Registration No. 1730/H14.

Diagnostic characters: Coloration: Pale yellow in colour with variable violet to blue black patches on head and body. **Clothing:** Body clothed with ciliated setae and scales bearing faint striations, scales mostly lanceolate. **Head:** Pear shaped. Frontal spines 4+4; ocelli 8+8. Head /Ant.I variable. **Thorax:** Relative length index of thoracic segments II: III 16:6.5. Legs similar, tibiotarsi divided anteriorly; unguis little curved with a paired basal, a medial unpaired and a subapical rudimentary teeth; unguiculus lanceolate; tenent hair well developed, finely ciliated, clavate. **Manubrium:** mucrodens = 37: 44; mucro deeply lobed into 7 teeth, dental scale appendages absent. Body length 2.5 –3 mm.

Distribution: INDIA: Chhattisgarh, Orissa and West Bengal.

SUMMARY

Altogether five species of Collembola belonging to two genera under the family Paronellidae have been recorded in the present paper. Diagnosis and distribution of each species

of Collembola from Chhattisgarh are also provided. All the species are recorded for the first time from the state.

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