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Checklist

Annotated checklist of Collembola of Nepal

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Abstract

This is the first annotated checklist of Collembola species of Nepal. It includes 167 collembolan species belonging to 78 genera and 17 families including 45 endemic species. Majority of the Nepalese collembolan species were reported from major trekking routes viz. Mount Everest, Annapurna Conservation Area and Langtang area with very few other locations. The highest record of collembola in Nepal is about 5800 m asl. Southern Terai and Siwalik range remain unexplored.

Keywords: Endemic species; Hexapods; *Himalanura*; *Nepalanura*; Springtails

1 | Introduction

Collembola, commonly known as springtails are widely distributed small terrestrial hexapods measuring 0.2–8 mm in size with approximately 9000 species in the World (Bellinger et al. 1996–2021; Deharveng et al. 2008; Timmermans et al. 2008). Previously they were considered as insects but the recent molecular studies reveal their pancrustacean relationship (Timmermans et al. 2008). They are the most diversified soil hexapods at local scale (<10 m^2) (Deharveng 1996). However, they live in wide range of habitats viz. soil, leaf litter, ground vegetation, tree trunk, tree canopy, seashore, caves, deserts and even in snow or ice (André 1983; Rodgers & Kitching 1998, 2011; Rusek 1998; Shaw 2013). They play a key role in soil influencing the soil formation, soil microbial ecology, nutrient cycling, and enhance soil fertility by decomposition (Behan-Pelletier 2003; Greenslade 2007; Santos et al. 2008; Snyder & Callaham 2019). Collembolan short generation period, lower dispersal capacity (Dunger & Voigtlander 2009), quick recovery with distinct alteration (Frampton 1994; Geissen & Kampichler 2004), sensitivity (Greenslade 2007) and susceptibility to any kind of disturbances (Petrillo & Witter 2005; Greenslade et al. 2011) make them valuable marker for the indication of environment (Abbas & Parwez 2019; Gruss et al. 2019; Yin et al. 2019).

The earliest available record of Nepalese Collembola date backs to early 1910s. The first species known from Nepal was probably *Callyntrura lineata* (Parona, 1892) which was originally described as *Paronella borneri* Imms, 1912. After forty six years later, two species *Onychiurus himalayensis* and *O. gurjakhanii* were described by Choudhuri (1958) from the collection of 1952 British (Natural History) Museum expedition to Nepal. The major taxonomic contributions on Nepalese Collembola were done only in late 1960s. Yosii (1966a, b, 1971) reported more than 60 species with the description of two new genera viz. *Nepalanura* and *Janetschekbrya* and several new species from Nepal. Later new additions were done by Mari Mutt and Bhattacharjee (1980), Mari Mutt (1981), Wilson (1982), Cassagnau (1984, 1993). In subsequent years, new records and species descriptions were further added from the previous expeditions' collections by Bedos and Deharveng (1991), Tamura and Zhao (1997), Thapa (1997), D'Haese and Weiner (1998), Potapov and Cassagnau (2000), Agolin et al. (2009), Thapa (2015), Zhang (2015), Schulz (2018). Thapa (1997) first time complied the all previously known collembolan from Nepal and listed 125 species and however his later published book of Insect Diversity of Nepal comprised only 122 species of Collembola (Thapa 2015).

Most of springtails' inventories in Nepal represent the high Himalaya, with very limited reports from mid-hills and low land. The uppermost record of collembolan from Nepal was from 5800 m asl (Janetschek 1990). Many pristine habitats of different physiographic zones of Nepal are still to be explored. The present list comprises 167 species within 78 genera, 17 families and 17 subfamilies. Taxonomic notes, global distribution of each genus is provided.

2 | Methods

The present checklist is based on the published papers on Collembola of Nepal including compiled list of Thapa (1997, 2015). All original descriptions were searched from https://biodiversityheritagelibrary.org and https://www.collembola.org. Recent papers were searched in Google and Google scholar. All species data are tabulated with the species name, original

designation, global species richness and order of taxonomic notes is provided. Classification of lower taxon categories (genus and species) are arranged according to alphabetical order and higher categories are arranged according to (Mandal 2018). The GPS point locality of reported species were noted, if not mentioned in published papers, these data were generated with the locality name given in the paper from the global georeferenced websites- (http://www.backups.nl/geocoding/, http://www.mapchannels.com/GeocoderSimple.aspx). In many cases, it is difficult to locate the specific point locality for many specific locations in rural areas. In this case, we used only one or two searchable localities for a district for several species. These data were used to prepare distribution map of recorded species of Collembola in Nepal so that district level information may remain intact.

3 | Results and discussion

3.1 | Collembola species diversity in Nepal

The updated list of Collembola of Nepal includes 167 species belonging to 78 genera in 17 subfamilies and 17 families (Table 1). Inventory of Collembola was concentrated along the major trekking routes in Nepal particularly west Nepal (Annapurna Conservation Area) and Central Nepal (Langtang area and trekking route from Banepa-Kavrepalanchowk-Ramechhap-Solukhumbu to Everest base camp) and few high elevation area of west Nepal (Fig. 1). Most of the Tarai and Shiwalik range are completely unexplored with a few exceptions (Fig. 2).

3.2 | Species Accumulation Curve

The inventory of Nepalese Collembola began in 1912. Yosii (1966, 1971) discovered 65 species from different part of the country. Janetscheki (1990) is another contributor to describe more than 70 species from Nepal. Based on the available information the species discovery curve is shown in Fig. 3.

3.3 | Endemic collembolan species

Endemism patterns varies among regions, habitats and taxa (Deharveng et al. 2008). Endemic species are special attention of conservation point of view. Collembola contain high endemic species (Martin et al. 2000). Nepal is rich in endemic fauna of Collembola. Out of 167 know species 45 species (27%) are endemic to Nepal (see * mark in the Table 1 for endemic species).

3.4 | Codes of references

[1. Agolin et al. 2009; 2. Bellinger and Ellis 1997; 3. Cassagnau 1984; 4. Cassagnau 1993; 5. Cassagnau and Deharveng 1981; 6. Choudhuri 1958; 7. D'Haese and Weiner 1998; 8. Imms 1912; 9. Janetschek 1990; 10. Mari Mutt 1979; 11. Mari Mutt 1981; 12. Mari Mutt 1985; 13. Mari Mutt and Bhattacharjee 1980; 14. Palacios-Vargas and Gomez-Anaya 1995; 15. Potapov and Cassagnau 2000; 16. Skarzynski and Smolis 2006; 17. Thapa 2015; 18. Wilson 1982; 19. Yosii 1966b; 20. Yosii 1970; 21. Yosii 1971; 22. Yosii 1977; 23. Yosii 1990; 24. Zhang 2015 25. Mandal and Hazra, 2009, 26. Schulz, 2018

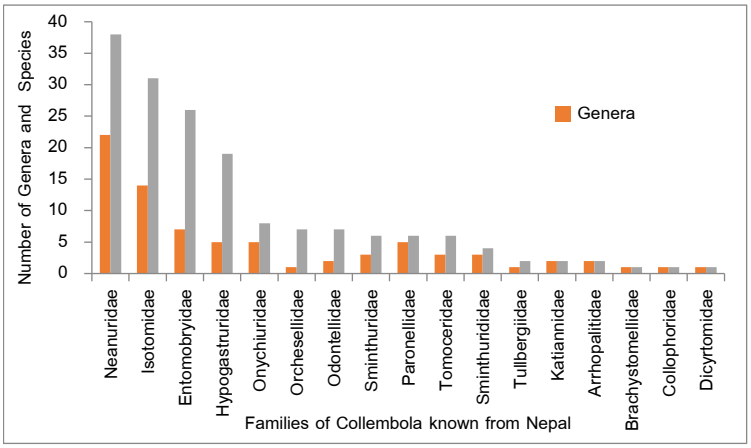

Figure 1. Generic and species diversity within Collembolan families

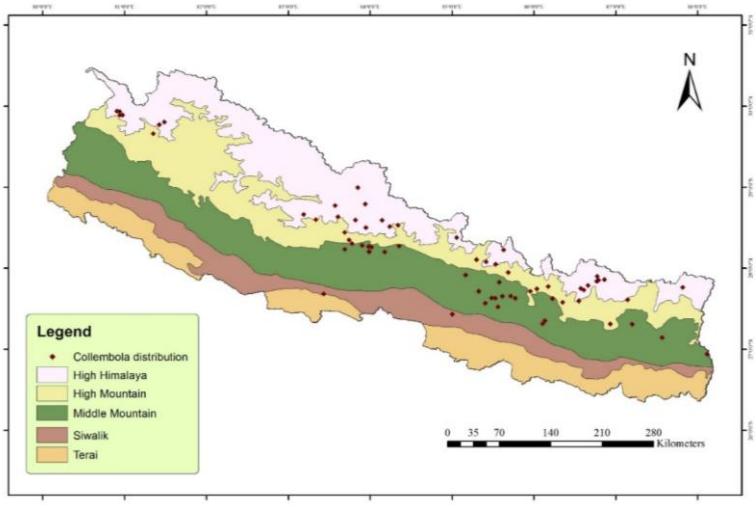

Figure 2. Distribution map of Collembola of Nepal

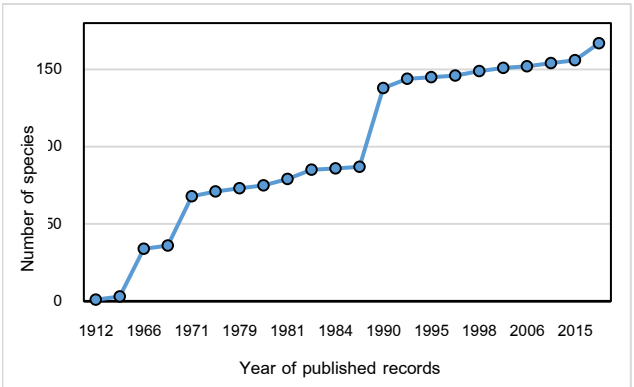

Figure 3. Accumulation curve of the number of Collembola species reported from Nepal

Table 1. Checklist of the Nepalese Collembola

Taxon	Elevation (m)	No. of Global Species*	References	Notes
Order: Entomobryomorpha Borner, 1913 **Superfamily: Entomobroidea Womerslley, 1934** **Family: Entomobryidae Schaffer, 1896** **Subfamily: Entomobryinae Schaffer, 1896**				
Genus: *Entomobrya* Rondani, 1861 Type species: *Degeeria muscorum* Nicolet, 1842		329 (5)		1
Entomobrya aino (Matsummura & Uchida, 1931)			26	
Entomobrya chomolungmae Yosii, 1971*	1200–4350		9	
Entomobrya chooyuae Yosii, 1971*	900–4350		9	
Entomobrya lhotseae Yosii, 1971*	1200–5700		9	
Entomobrya rohtagensis Baijal, 1958			23	
Entomobrya sp.			17	
Genus: *Himalanura* Baijal, 1958 Type species: *Himalanura indica* Baijal, 1958		19 (5)		
Himalanura kangbachensis (Yosii, 1966)*	1500–4500		9	
Himalanura khumbuensis (Yosii, 1971)*	1200–4300		9	
Himalanura makaluae (Yosii, 1971)*	1200–3900		9	
Himalanura nuptseae (Yosii, 1971)*	1680–5250		9	
Himalanura pangpochensis (Yosii, 1971)*	1200–4300		9	
Genus: *Sinella* Brook, 1882 Type species: *Sinella curviseta* Brook, 1882		87 (1)		
Sinella caeca (SchÖtt, 1896)	1200–4300		9	
Sinella sp.	1100		18	
Subfamily: Willowsiinae Yoshi and Suhardjao, 1989				
Genus: *Janetschekbrya* Yosii, 1971 Type species: *Janetschekbrya himalica* Yosii, 1971		2 (2)		2
Janetschekbrya brahamides (Denis, 1936)	1200–4500		9	3
Janetschekbrya himalica Yosii, 1971*	3900–4100		9	
Genus: *Willowsia* Shoebotham, 1917 Type species: *Seira nigromaculata* Lubbock, 1873		40 (3)		2
Willowsia cassagnaui Zhang, 2015*			24	
Willowsia ieti Yosii, 1971*			24	4
Willowsia nivalis Yosii, 1971*			9	
Subfamily: Lepidocyrtinae Wahlgren, 1906				
Genus: *Lepidocyrtus* Boulet, 1839 Type species: *Lepidocyrtus curvicollis* Boulet, 1839		273 (3)		
Lepidocyrtus himalayanus Yosii, 1971*			21	
Lepidocyrtus cf. *instratus*			17	
Lepidocyrtus ornatus Yosii, 1966*	2492–4160		9	
Lepidocyrtus sp.	1100		18	
Genus: *Pseudosinella* Schäffer, 1897 Type species: *Tullbergia immaculate* Lie-Petersen, 1897		380 (4)		
Pseudosinella cf. *immaculata*	1300–3600		17	5
Pseudosinella inaequalis Stach, 1960			17	6
Pseudosinella montis Yosii, 1971*	2700–3100		21	
Pseudosinella vallis Yosii, 1971*	1200–3081		9	
Family: Orchesellidae Borner, 1906 **Subfamily: Heteromurinae Absolon & Kseneman, 1942**				
Genus: *Dicranocentrus* SchÖtt, 1893 Type species: *Dicranocentrus gracilis* SchÖtt, 1893		70 (7)		
Dicranocentrus deharvengi Mari Mutt, 1981	1900–2600		11	
Dicranocentrus indecisus Mari Mutt, 1985			12	
Dicranocentrus cf. *indicus*	2400–3081		10	
Dicranocentrus janetscheki Yosii, 1971*			10	
Dicranocentrus nepalensis Mari Mutt, 1980*			13	
Dicranocentrus pilosus Mari Mutt, 1980*	1500–3325		13	7
Dicranocentrus violaceus Mari Mutt, 1981*	1000–1500		11	
Family: Paronellidae Borner, 1913 **Subfamily: Paronellinae Borner, 1913**				8
Genus: *Callyntrura* Börner, 1906 Type species: *Paronella anopla* Börner, 1906		98 (1)		11

Callyntrura lineata (Parona, 1892)			8	12
Genus: *Cyphoderopsis* Carpenter, 1917 Type species: *Cyphoderopsis kempi* Carpenter, 1917		17 (1)		9
Cyphoderopsis nepalensis (Wilson, 1982)*			18	
Genus: *Cyphoderus* Nicolet, 1842 Type species: *Cyphoderus albinus* Nicolet, 1842		72 (1)		
Cyphoderus albinus Nicolet, 1842			17	
Genus *Dicranocentroides* Imms, 1912				
Dicranocentroides flavescens Yosii, 1966			25	
Genus: *Troglopedetes* Absolon, 1907 Type species: *Troglopedetes albus* Joseph, 1872		33 (1)		9, 10
Troglopedetes churchillatus Wilson, 1979*	1000–1100		18	
Troglopedetes nepalensis Wilson, 1982*	1100		18	
Superfamiy: Isotomoidea Szeptycki, 1979 **Family: Isotomidae Schaffer, 1896** **Subfamily: Anurophorinae Borner, 1901**				
Genus: *Anurophorus* Nicolet, 1842 Type species: *Anurophorus laricis* Nicolet, 1842		52 (2)		
Anurophorus cuspidatus Stach, 1920	900–5570		9	
Anurophorus sp.			17	
Genus: *Cryptopygus* Willem, 1901				
Cryptopygus thermophilus (Axelson, 1900)	1100		18	40
Genus: *Folsomia* Willem, 1902 Type species: *Folsomia candida* Willem, 1902		202 (7)		
Folsomia altamontana Yosii, 1971*	900–5600		9	
Folsomia candida Willem, 1902	1200–4300		9	
Folsomia diplophthalma (Axelson, 1902)	900–5570		9	
Folsomia fimetaria (Linnaeus, 1758)			17	
Folsomia obscurocellata Patapov & Cassagnau, 2000			15	
Folsomia octoculata Handschin, 1925			22	
Folsomia riozoyoshiii Patapov & Cassagnau, 2000			15	
Genus: *Hemisotoma* Bagnall, 1949 Type species: *Isotoma thermophila* Axelson, 1900		10 (1)		
Hemisotoma thermophila (Axelson, 1900)			17	
Genus: *Isotomiella* Bagnall, 1939 Type species: *Isotomiella distinguenda* Bagnall, 1939		55 (1)		
Isotomiella minor (Schäffer, 1896)	1100–3600		17, 18	
Genus: *Uzelia* Absolon, 1901 Type species: *Uzelia setifera* Absolon, 1901		12 (1)		
Uzelia cf. *setifera*	1700–4500		9	
Subfamily: Isotominae Schaffer, 1896				
Genus: *Desoria* Agassiz & Nicolet, 1841 Type species: *Desoria saltans* Agassiz & Nicolet, 1841		102 (3)		
Desoria mazda (Yosii, 1971)			9	14
Desoria cf. *olivacea*			9	
Desoria trispinata (Mac Gillivary, 1896)			9	
Genus: *Isotoma* Bourlet, 1839 Type species: *Isotoma viridis* Bourlet, 1839		68 (4)		
Isotoma anglicana Lubbock, 1873	3750		26	
Isotoma decorata Brown, 1926	900–5570		9	
Isotoma diverticula Yosii, 1966	2700–4500		19	
Isotoma nepalica Yosii, 1966*	1219–4300		9	
Isotoma cf. *viridis*	1420–5450		9	
Genus: *Parisotoma* Bagnall, 1940 Type species: *Isotoma notabilis* Schäffer, 1896		28 (3)		
Parisotoma coeca Yosii, 1966			19	
Parisotoma ekmani (Fjellberg, 1977)			9	13
Parisotoma notabilis (Schäffer, 1896)			17	
Genus: *Pseudisotoma* Handschin, 1924 Type species: *Isotoma sensibilis* Tullberg, 1876		8 (1)		
Pseudisotoma himalayana Yosii, 1971*			9	
Subfamily: Proisotominae Stach, 1947				
Genus: *Folsomides* Stach, 1922		74 (3)		

Type species: *Folsomides parvulus* Stach, 1922				
Folsomides angularis (Axelson, 1905)	1200–4300		9	
Folsomides nepalicus Yosii, 1971*	1200–5570		9	
Folsomides parvulus Stach, 1922	1100–4500		9, 18	41
Genus: *Folsomina* Denis, 1931 Type species: *Folsomina onychiurina* Denis, 1931		5 (1)		
Folsomina onychiurina Denis, 1931	1360–2800		17	15
Genus: *Proisotoma* Börner, 1901 Type species: *Isotoma minuta* Tullberg, 1871		78 (1)		
Proisotoma tenella (Reuter, 1895)	950–3600		17	
Genus: *Weberacantha* Christiansen, 1951 Type species: *Weberacantha octa* Christiansen, 1951		7 (1)		
Weberacantha janetscheki (Yosii, 1971)	900–4550		9	
Superfamily: Tomoceroidea Szeptycki, 1979 **Family: Tomoceridae Schaffer, 1896**				
Genus: Plutomurus Yosii, 1956				
Plutomurus vigintiferispina Lee, 1974			26	
Genus: *Tomocerina* Yosii, 1955 Type species: *Tomocerus minutus* Tullberg, 1876		14 (1)		
Tomocerina simplex Yosii, 1966	2750		19	
Tomocerina aokii (Yosii, 1972)			26	
Genus: *Tomocerus* Nicolet, 1842 Type species: *Pogonognathellus longicornis* Muller, 1776		108 (3)		
Tomocerus nepalicus Yosii, 1971*			9	
Tomocerus ocreatus Denis, 1948	1600–2400		17	
Tomocerus steinbocki Yosii, 1971	3900-4500		9	
Order: Poduromorpha Borner, 1913 **Superfamily: Hypogastruroidea Salmon, 1964** **Family: Hypogastruridae Borner, 1906**				
Genus: *Acherontides* Bonet, 1945 Type species: *Acherontides atoyacensis* Bonet, 1945		12 (1)		16
Acherontides edaphicus Yosii, 1971	1200–4500		9	
Genus: *Ceratophysella* Börner, 1932 Type species: *Podura armata* Nicolet, 1842		140 (7)		
Ceratophysella communis (Folsom, 1898)	950–2000		17	
Ceratophysella denticulata (Bagnall, 1941)	2700–2850		17	
Ceratophysella horrida (Yosii, 1960)			22	19
Ceratophysella planipila Yosii, 1966	2400		19	
Ceratophysella postantennalis Yosii, 1966	1200–4550		16	17,18
Ceratophysella cf. *sinensis*	2400		17	
Ceratophysella cf. *vulgaris*			17	19
Genus: *Hypogastrura* Bourlet, 1839 Type species: *Hypogastrura aquatic* Bourlet, 1839		175 (3)		
Hypogastrura carpentana Bonet, 1930	1100		18	
Hypogastrura distincta (Axelson, 1902)	1200–4550		17	
Hypogastrura himalayana Yosii, 1971	1680–4550		9	
Hypogastrura nepalica Yosii, 1966*			19	18
Genus: *Willemia* Börner, 1901 Type species: *Willemia anophthalma* Börner, 1901		48 (5)		
Willemia annapurna D'Haese & Weiner, 1998			7	
Willemia anophthalma Börner, 1901	1200–4500		9	
Willemia buddenbrocki Huther, 1959	1900–2400		17	20
Willemia nepalensis D'Haese & Weiner, 1998*			7	
Willemia wandae Tamura & Zhao, 1997			7	
Genus: *Xenylla* Tullberg, 1869 Type species: *Xenylla maritime* Tullberg, 1869		146 (2)		
Xenylla obscura Imms, 1912	900–5570		9	
Xenylla yosiiana de Gama, 1971	1420–5450		9	
Xenylla mucronata Alexon, 1903			26	
Superfamily: Neanuroidea Massoud, 1967 **Family: Brachystomellidae Stach, 1949**				
Genus: *Brachystomella* Ågren, 1903 Type species: *Brachystomella maritime* Ågren, 1903		79 (1)		

Brachystomella parvula (Schäffer, 1896)	2700		17	
Family: Neanuridae Borner, 1901 **Subfamily: Frieseinae Massoud, 1967**				
Genus: *Friesea* Dalla Torre, 1895 Type species: *Triaena mirabilis* Tullberg, 1871		197 (3)		
Friesea excelsa Denis, 1936	1200–4550		9	
Friesea paula Yosii, 1966	2700		19	
Friesea sublimis Macnamara, 1921	2000		17	
Subfamily: Neanurinae Borner, 1901				
Genus: *Chaetobella* Cassagnau, 1983 Type species: *Lobella numatai* Yosii, 1966		9 (1)		
Chaetobella numatai (Yosii, 1966)	2400–2705		19	
Genus: *Gnatholonche* Börner, 1906 Type species: *Achorutes lipaspis* Börner, 1906		25 (1)		
Gnatholonche anomala (Yosii, 1966)	3600		19	
Genus: *Himalmeria* Cassagnau, 1984 Type species: *Himalmeria lama* Cassagnau, 1984;		20 (3)		25
Himalmeria digitata Cassagnau, 1984			3	
Himalmeria gurung Cassagnau, 1984*			2	
Himalmeria himalayana (Yosii, 1966)*			19	
Genus: *Lobella* Cassagnau, 1983				
Lobella kraepelini (Börner, 1906)	1100		18	42
Genus: *Lobellina* Yosii, 1956 Type species: *Lobella roseola* Yosii, 1954		25 (1)		
Lobellina roseola (Yosii, 1954)	4160		17	23
Genus: *Nepalanura* Yosii, 1966 Type species: *Nepalanura paranuroides* Yosii, 1966		1 (1)		
Nepalanura paranuroides Yosii, 1966	2400–2700		19	
Genus: *Nepalimeria* Cassagnau, 1984 Type species: *Nepalimeria dal* Cassagnau, 1984		6 (6)		25
Nepalimeria coccinea Cassagnau, 1984			4	
Nepalimeria dal Cassagnau, 1984			4	
Nepalimeria ganesh Cassagnau, 1993*			4	
Nepalimeria heterochaeta Cassagnau, 1984			4	
Nepalimeria khorensis Cassagnau, 1984*			4	
Nepalimeria lepchana (Yosii, 1966)*			4	
Genus: *Paleonura* Cassagnau, 1982 Type species: *Paleonura spectabilis* Cassagnau, 1982		53 (5)		
Paleonura khumbica (Cassagnau, 1971)*	1200–1500		9	21,22
*Paleonura monophthalma (*Yosii, 1966)	2400		19	
Paleonura reducta (Yosii, 1966)	950		19	22
Paleonura siva (Yosii, 1966)			19	
Paleonura spectabilis Cassagnau, 1982			14	
Genus: *Paranura* Axelson, 1902 Type species: *Paranura sexpunctata* Axelson, 1902		37 (2)		
Paranura quadripunctata Yosii, 1966	2700		19	
Paranura ieti (Yosii, 1966)			19	
Genus: *Propeanura* Yosii, 1956 Type species: *Neanura pterothryx* Yosii, 1956		14 (2)		26
Propeanura hygrophila (Cassagnau & Deharveng, 1981)			5	
Propeanura lapidicola (Cassagnau & Deharveng, 1981)			5	
Genus: *Synmeria* Cassagnau, 1983 *Type species: Phylliomeria miranda* Yosii, 1966		3 (1)		
Synmeria miranda (Yosii, 1966)	2700		9	
Genus: *Yuukianura* Yosii, 1955 Type species: *Protanura aphoruroides* Yosii, 1953		10 (1)		23
Yuukianura yasudai (Yosii, 1966)			19	24
Subfamily: Pseudachorutinae Borner, 1906				
Genus: *Cassagnaudina* Massoud, 1967 Type species: *Pseudachorudina coiffaiti* Cassagnau, 1955		4 (1)		
Cassagnaudina khumbuensis Yosii,1971*	700–4550		9	
Genus: *Cephalachorutes* Bedos & Deharveng, 1991 Type species: *Cephalachorutes asiaticus* Bedos & Deharveng, 1991		16 (1)		

Cephalachorutes nakaoi (Yosii, 1966)	3500		19	30
Genus: *Furculanurida* Massoud, 1967 Type species: *Micranurida africana* Massoud, 1963		17 (1)		
Furculanurida ashrafi (Yosii, 1966)			19	
Genus: *Grananurida* Yosii, 1954 Type species: *Grananurida tuberculata* Yosii, 1954		5 (1)		29
Grananurida alba (Yosii, 1966)	3600		19	
Genus: *Hylaeanura* Arlé, 1966 Type species: *Paranurella infima* Arlé , 1959		5 (1)		27
Hylaeanura nepalensis (Yosii, 1966)*			19	28
Genus: *Micranurida* Börner, 1901 Type species: *Micranurida pygmaea* Börner, 1901		28 (1)		
Micranurida pygmaea Börner, 1901	2000–3600		17	
Genus: *Pseudachorudina* Stach, 1949 Type species: *Pseudachorudina alpine* Stach, 1949		15 (1)		
Pseudachorudina nepalica Yosii, 1966*	2400		19	
Genus: *Pseudachorutes* Tullberg, 1871 Type species: *Pseudachorutes subcrassus* Tullberg, 1871		122 (2)		
Pseudachorutes corticicolus (Schäffer, 1896)	1200–4550		9	31
Pseudachorutes kanchenjungae Yosii, 1966*	4160		19	
Genus: *Simonachorutes* Skarzyniski, Arbia, Piwnik, 2016				
Simonachorutes cf. *romeroi*			26	
Superfamily: Onychiuroidea D'Haese, 2002 **Family: Odontellidae Massoud, 1967**				
Genus: *Austrodontella* Ellis & Bellinger, 1973 Type species: *Odontella trispina* Salmon, 1951		2 (1)		
Austrodontella trispina (Womersley, 1935)	900–4550		17	
Genus: *Superodontella* Stach, 1949 Type species: *Odontella ewingi* Folsom, 1916		70 (5)		
Superodontella cf. *distincta*	1400–3600		17	32
Superodontella gladiator Agolin, Houssin & Deharveng, 2009			1	
Superodontella lamellifera (Axelson, 1903)	3500–4160		17	
Superodontella montemaceli Arbea & Weiner, 1992	2800		26	
Superodontella nepalica (Yosii, 1971) *			9	
Superodontella virgulata Yosii, 1966	2400		19	
Family: Tullbergiidae Bagnall, 1935				
Genus: *Mesaphorura* Börner, 1901 Type species: *Mesaphorura krausbaueri* Börner, 1901		54 (2)		
Mesaphorura himalayensis Yosii, 1971*	1200–4300		9	33
Mesaphorura krausbaueri Börner, 1901			17	
Family: Onychiuridae Borner, 1901 **Subfamily: Onychiurinae Borner, 1901**				
Genus: *Deharvengiurus* Weiner, 1996 Type species: *Onychiurus argus* Denis, 1924		10 (1)		
Deharvengiurus cf. *argus*	1200–4300		9	
Genus: *Oligaphorura* Bagnall, 1949 *Type species: Aphorura absoloni* Börner, 1901		62 (2)		
Oligaphorura cf. *groenlandicus*			17	
Oligophorura palissai (Yosii, 1971)			21	
Genus: *Onychiurus* Gervais, 1841 Type species: *Podura ambulans* Linnaeus, 1758		50 (1)		
Onychiurus decemsetosus Yosii, 1966	1200–4300		9	
Genus: *Orthonychiurus* Stach, 1954 Type species: *Onychiurus rectopapilatus* Stach, 1933		28 (2)		
Orthonychiurus gurjakhanii Choudhuri, 1958*			6	
Orthonychiurus himalayensis (Choudhuri, 1958)*			6	
Genus: *Thalassaphorura* Bagnall, 1949 Type species: *Onychiurus franzi* Stach, 1946		71 (2)		
Thalassaphorura yodai (Yosii, 1966)	1100		18, 22	
Thalassaphorura cf. *encarpata*			17	34
Order: Symphypleona Borner, 1901 **Family: Arrhopalitidae Stach, 1956**				
Genus: *Arrhopalites* Börner, 1906		52 (1)		36

Type species: *Sminthurus caecus* Tullberg, 1871				
Arrhopalites nivalis Yosii, 1966	950–4500		20	
Genus: *Pygmarrhopalites* Vargovitsh, 2009 Type species: *Dicyrtoma pygmaea* Wankel, 1860		101 (1)		36,37
Pygmarrhopalites habei (Yosii, 1956)			21	
Family: Collophoridae Bretfeld, G, 1999				
Genus: *Collophora* Richards, 1964 Type species: *Arrhopalites quadrioculata* Denis, 1933		9 (1)		
Collophora mysticiosa Yosii, 1966	2000		19	
Family: Dicyrtomidae Borner, 1906 **Subfamily: Ptenothricinae**				
Genus: *Ptenothrix* Börner, 1906 Type species: *Podura atra* Linnaeus, 1758		88 (1)		
Ptenothix himalayensis Yosii, 1966*	2000–3600		19	38
Family: Katiannidae Borner, 1913				
Genus: *Papirinus* Yosii, 1954 Type species: *Papirius prodigiosus* Yosii, 1954		4 (1)		
Papirius ieti Yosii, 1966	2000–28000		20	
Genus: *Stenognagthellus* Stach, 1956 Type species: *Stenognagthellus denisi* Cassagnau, 1953		4 (1)		35
Stenognagthellus cassagnaui Yosii, 1966	2705		19	
Family: Sminthuridae Lubbock, 1862 **Subfamily: Sminthurinae Lubbock, 1862**				
Genus: *Sminthurus* Latreille, 1802 Type species: *Podura viridis* Linnaeus, 1758		83 (2)		
Sminthurus hispanicus Nayrolles, 1995	3400		26	
Sminthurus leucomelanus, Nayrolles, 1995	2800		26	
Sminthurus sp.1	1500–2675		9	
Sminthurus sp.2	1200–4300		9	
Subfamily: Sphyrothecinae Betsch, 1980				
Genus: *Sphyrotheca* Börner, 1906 Type species: *Sminthurus multifasciata* Reuter, 1881		26 (1)		
Sphyrotheca gangetica Yosii, 1966			19	
Genus: *Szeptyckitheca* Betsch & Weiner, 2009 Type species: *Szeptyckitheca kesongenesis* Betsch & Weiner, 2009		12 (1)		39
Szeptyckitheca nepalica (Yosii, 1966)*	1360–2750		19	
Family: Sminthurididae Borner, 1906				
Genus: *Sphaeridia* Linnaniemi, 1912 Type species: *Sminthurus pumilis* Krausbauer, 1898		70 (2)		
Sphaeridia murphyi Yosii, 1966	2750		19	
Sphaeridia zaheri Yosii, 1966			19	
Genus: *Stenacidia* Börner, 1906 Type species: *Sminthurides violacea* Salmon,1956		3 (1)		
Stenacidia picta Yosii, 1966	1200–3600		9	
Genus: *Yosiides* Massoud & Betsch, 1972 Type species: *Sminthurides himachal* Yosii, 1966		2 (1)		
Yosiides himachal (Yosii, 1966)	2705		19	

3.5 | Annotations

1. Species level identification of the Genus *Entomobrya* Rondani, 1861 is considered the problematic due to intraspecific morphological variations. Combination of both chaetotaxy and morphological characters are useful tools to identify them (Jordana & Baquero 2005), but it is not without complications (Katz et al. 2015).
2. *Willowsia* and *Janetschekbrya* are included in *Willowsia*-complex because of their scale morphology and chaetotaxy, directly derived from the *Himalanura*-like species (Zhang et al. 2011).
3. *Sira brahmides* and its re-described combination *Janetschekbya brahmides* are proposed to be different species. It is supported by the differences in claw structure, color and geographical distribution (Zhang et al. 2011).
4. Zhang (2015) re-described *Willowsia ieti* Yosii, 1971 with the addition of characteristics such as details of mouthparts and whole body chaetotaxy.
5. Folsom (1902) stated formerly that *Pseudosinella argentae* differs from *Tullbergia immaculata* in claw and mucrones but these two species are now synonymized (Bellinger et al. 1996–2021).
6. *Pseudosinella inaequalis* Bagnall, 1941 and *Pseudosinella inaequalis* Stach, 1960 nec Bagnall are treated as two different species (Christiansen & Bellinger 1996, Bellinger et al. 1996-2021).
7. *Dicranocentrus pilosus* Mari Mutt, 1980 has distinct morphology than other members of the genus *Dicranocentrus*, so it should be revised and placed in another genus (Cipola et al. 2016).

8. Cyphoderidae is included as subfamily within Paronellidae (Soto-Adames et al. 2008).
9. Absolon (1907) mentioned the type specie of *Troglopedetes* was as *T. pallidus* Absolon, 1907 (Wilson 1982, Thibaud & Najt 1988).
10. *Troglopedetes* Absolon, 1907 was synonymized with *Troglopedetina* Delamare Deboutteville, 1945 after reviewing correspondence of characters) and *Troglopedetes* Absolon, 1907 might be junior homonym or synonym to *Troglopedetes* Joseph, 1872 (Ellis & Bellinger 1973, Wilson 1982).
11. *Paronella anopla* is synonymized with *Callyntrura longicornis* (Mitra & Dallai 1980, Bellinger et al. 1996–2021).
12. Yosii (1966a) transferred the species *Paronella borneri* Imms, 1912 and *Hanschinphysa borneri* Salmon, 1966 to *Callyntrura* and synonymized with his species. The species *Paronella borneri* is also synonymized with *Callyntrura lineata* (Parona, 1892) (Mandal & Hazra 2009).
13. As *Parisotoma ekmani* (Fjellberg, 1977) have lost microsensilla on 2nd abdominal segment is group position in current taxonomy is uncertain (Potapov et al. 2011).
14. *Isotoma mazda* Yosii, 1971 was transferred to the genus *Desoria* despite its unusual fit as finding new characters for new taxon was not possible (Yosii, 1990). Mandal & Hazra (2009) placed this species under the subgenus *Desoria* of the genus *Isotoma.*
15. Lawrence (1969) re-described *Folsomina onychiurina* Denis, 1931 and stated that some specimens described from Nepal may refer to *F. yosii*. However, Christiansen & Bellinger (1992) clarified that both are certainly the same species. And, the species described by Lawrence (1969) is undoubtedly a different species which was later named as *Folsomina lawrencei* by Greenslade (1999).
16. Gender of the type species of genus *Acherontides* is treated as neuter in original description (Ellis & Bellinger 1973).
17. *Ceratophysella postantennalis* recorded by Yosii (1966b) from Solukhumbu match the description of *Ceratophysella morula,* so the morphologies of both should be well studied before considering the former species as new (Skarzynski & Smolis 2006).
18. *Ceratophysella postanetennalis* and *Hypogastrura nepalica* are diagnosed as conspecific thus synonymized. It is because the original description of *Ceratophysella postantennalis* was based on the *Hypogastrura nepalica* (See Skarzynski & Smolis 2006).
19. Yosii (1960, 1962) split the genus *Hypogastrura* into three subgenus *viz*. *Ceratophysella*, *Cyclograna* and *Hypogastrura* based on the known chaetotaxy, later treated as genus. But he mentioned in the paper that his description of genus *Hypogastrura* resembles with some members of genus *Ceratophysella* so it needs further modifications (Yosii 1960).
20. *Willemia buddenbrocki*-group is monophyletic and has distinct clade of its 10 species involved (D'Haese & Weiner 1998).
21. Name of the author of *Paleonura khumbica* is given as *Paleonura khumbica* (Yosii, 1971) in Janetschek (1990) and *Paleonura khumbica* (Cassagnau, 1971) in Bellinger et al. (1996–2021).
22. Janetschek (1990) has incorrect spelling for *Paleonura* as *Paleanura*.
23. Yosii (1977) had established *Lobellina* as subgenus and *Yuukianura* as special group within the genus *Lobella.*
24. Deharveng et al. (2017) proposed for the transfer of *Lobella yasudai* to Genus *Yuukianura* for their poorly developed tubercles, complex mouthparts and lateral shift of chaetae on 5th abdominal segment.
25. Cassagnau (1993) clarified that there is an adaptive convergence between the *Himalmeria* and *Nepalimeria* which is why they were commonly placed in the genus *Phylliomeria* formerly by Yosii.
26. Selection of *Lobella ieti* Yosii, 1966 as type species for *Propanura* by Cassagnau in 1980 violates the article 61 of International Code of Zoological Nomenclature (Ellis & Bellinger 1984).
27. The species *Paranurella infima* was first described by Arlé in 1959 (Vázquez et al. 1998) and not in 1960. Genus *Hylaeanura* Arlé, 1966, also considered as *Kenyura* by other authors previously, is delineated based on hypertrophied sensilla S8 on 4th antennal segment (Vázquez et al. 1998, Palacios-Vergas & Deharveng 2010).
28. *Paranura nepalensis* Yosii, 1966 was considered to be included in the genus *Kenyura* but as the S8 sensillum is hypertrophied it was transferred to the genus *Hylaeanura* (Vázquez et al. 1998).
29. *Agranurida* Kim and Lee, 2000 referred to as synonymy of the genus *Grananurida* is actually incorrectly spelled (Bellinger et al. 1996–2021).
30. *Pseudachorutella nakaoi* Yosii, 1966 was transferred to the genus *Cephalachorutella* primarily based on the antennal chaetotaxy (Bedos & Deharveng 1991).
31. Bellinger et al. (1996–2021) has incorrectly mentioned date of description of *Pseudachorutes corticicolus* as 1897 instead of 1896.
32. *Odontella distincta* is listed in Checklist of Collembola of the World as *Odontella distincta* Peja, 1985 nec Yosii, 1954 (Bellinger et al. 1996–2021).
33. *Mesaphorura himalayensis* Yosii, 1971 should be revised for its genus as its pseudocelli are not star shaped (Bellinger et al. 1996–2021).
34. *Thalassaphorura encarpata* (Denis, 1931) is synonymized with *Onychiurus hortensis* Gisin, 1949 (Bellinger et al. 1996–2021).
35. *Stenognathellus* Cassagnau, 1953 is an unavailable name as type species is not designated for it (Ellis & Bellinger 1973).
36. With the revision, species of the genus *Arrhopalites* was split into two genera as caecus-group and pygmaeus-group into *Arrhopalites* and *Pygmarrhopalites* respectively (Vargovitsh 2009)
37. Zeppelini (2011) discusses that genus *Pygmarrhopalites* only informs about the pygmaeus-group so it should be treated as junior synonym of *Arrhoplaites*.
38. Yosii (1969) re-described S-chaetotaxy of *Ptenothrix himalayensis* to free the ambiguity of previous description.
39. All the species of the genus *Szeptyckitheca* are to be re-examined of body chaetotaxy for clear definition of genus and its phylogenetic relationship (Zeppelini et al. 2019).
40. Wilson (1982) misspelled "*Cryptopygus*" as "*Cryptopagus*".
41. Wilson (1982) identified *Folsomides exiguss* from Mahendra cave, Pokhara which is a junior synonym of *Folsomides parvulus.*
42. Wilson (1982) found *Lobella kraepelina* from Mahendra cave, Pokhara. But other authors spelled it as "kraepelini" (Yosii, 1959; Mandal and Hazra, 2009). Mandal (2018) placed this species under the genus *Hyperlobella* Cassagnau, 1988.

5 | Conclusions

The history of collembolan research in Nepal is of about 110 years. All collembolan faunae of Nepal were investigated by foreign scientists. Species level information is scattered in various publications all over the world. Species checklists are important to understand species diversity and richness in a particular geographic area given in specific time which is the first

basic information required for ecological studies, biodiversity assessments and developing biodiversity conservation strategies. Faunal checklists are lacking in Nepal. The present list includes 167 species belonging to 78 genera and 17 families including 45 endemic species to Nepal. The most of the collections of collembolan was found from the mountain trekking routes in Nepal. Tarai and Shiwalik range remains still unexplored.

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Authors' contributions

Both authors wrote the manuscript. Shrestha, P. prepared the distribution map of Collembola in Nepal. Budha, P. edited the manuscript, incorporated reviewer's comments and finalized it.

Conflicts of interest

Authors declare no conflict of interest.

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