International Journal of Fauna and Biological Studies
Available online at www.faunajournal.com

IJFBS
International Journal of Fauna And Biological Studies

ISSN 2347-2677
IJFBS 2016; 3(2): 91-97
Received: 26-01-2016
Accepted: 27-02-2016

Y Chezhian
Southern Regional Centre,
Zoological Survey of India,
Chennai - 600 028

S Prabakaran
Southern Regional Centre,
Zoological Survey of India,
Chennai - 600 028

Correspondence:
Y Chezhian
Southern Regional Centre,
Zoological Survey of India,
Chennai - 600 028

Diversity of millipedes (Myriapoda: Diplopoda) In Yelagiri hills, Eastern Ghats, Vellore district, Tamil Nadu

Y Chezhian, S Prabakaran

Abstract
Species diversity of the millipedes (Diplopoda) of Yelagiri hills of Southern Eastern Ghats of Tamil Nadu, India. Ten species of millipedes were identified; *Gyrodrepanum lamprum* (Chamberlin, 1920), *Anoplodesmus saussurii* (Humbert, 1865), *Arthrosphaera brandtii* (Humbert, 1865), *Arthrosphaera disticta* Pocock, 1895, *Arthrosphaera fumosa* Pocock, 1895, *Arthrosphaera magna* Attems, 1936, *Arthrosphaera lutescens* (Butler, 1872), *Arthrosphaera thurstoni* Pocock, 1895, *Trigoniulus corallinus* (Gervais, 1847) and *Xenobolus carnifex* (Fabricius, 1775), belonging to four families and three orders were recorded from the different habitat of Yelagiri hills of Southern Eastern Ghats of Tamil Nadu. The genus *Arthrosphaera* is more dominant than other genera.

Keywords: Diplopoda, millipede diversity, Yelagiri Hills, Vellore district, Southern Eastern Ghats, Tamil Nadu

Introduction
Millipedes are one of the largest macro arthropods in forest ecosystems and play vital role of detritivores invertebrates in enriching decomposition of dead plant material is to stimulate microbial activity (Price 1988); apparently affecting nutrient cycling through the redistribution of organic material and consequently, the release of chemical elements such as nitrogen in the soil.

Knowledge of the Indian Millipedes is fragmentary and scattered; studies on Indian millipedes (Diplopoda). The objectives of present study to identify and the species richness of millipede in Yelagiri hills Southern Eastern Ghats of Tamil Nadu.

Materials and Methods
Study Area: The Yelagiri lies between 12º34′41″ N longitudes and 78º 38′ 27″ E latitude and located in Tirupattur Taluk of the Eastern Ghats of Vellore District, Tamil Nadu, India. It spreads over an area of 30 sq km with an elevation of 1048 meter above sea level and lies in between four mountains. The hill station dates back to the British colonial days. "The Whole of Yelagiri was once the private property of the Yelagiri Zamindar Family. It was taken over by the government of India during the Early 1950s. The house of the Yelagiri Zamindars still exists in Reddiyur." Yelagiri is one of the famous places for trekkers in India. The Maximum temperature of Yelagiri hills during summer (April) is of 27°C and the minimum temperature goes down in winter between December and January to 11°C. It has comparative dry climate with low humidity of 45-50%. The mean annual rainfall for Yelagiri hills is 1026.16 mm. and a maximum of 131.8 mm received during South West monsoon and 333.7 mm during Northeast monsoon. About 50 percent of the land area is red loam clay and sandy soil that roughly constituting 13 and 12 percent of the total area respectively. Soil is derived from feldspar and hornblende. There are 14 villages namely Athanavur, Kottur, Kottaiyur, Mangalam, Manchankolli, Mettukaniyur, Muthanur, Nilavur, Paduvanur, Pallakaniyur, Punganur, Puthur, Rayaneri and Thyalur.

Collection Methods
Faunistic collections of diplopods are usually effectuated by means of hand sorting from (sieved) forest litter, rotten wood and all other kinds of plant debris as well as the uppermost soil strata. Millipedes can be taken from under stones, logs, shingle, various driftwood remains, algae etc. A faunistic survey was carried out for one year; in quarterly for period from January to December 2013 and almost the survey and sample collected completed entire

Yelagiri hills area. Millipede samples are collected unusually in Zip lock transparent plastic bag along temporary label written with soft pencil is placed into each bag or cover, according to the notes you make in your field notebook.

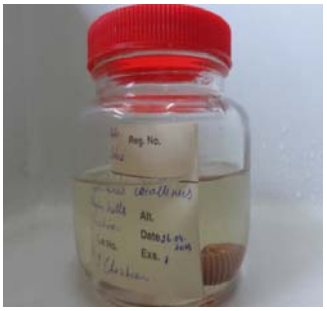
When in the laboratory, all material are sorted out and materials were keeping with permanent in 70-75% fully sunk in alcohol and this time each sample is supplied with permanent label written with waterproof Indian ink or printed photo label is worse because wet swelled inscription is lightly skinned during work with collected material, reading the exact locality, kind of habitat, the date of capture, and the collector name (Plate -1). Identification of a millipede usually requires dissection, which in its turn makes the use both of a quality stereoscope with a focused light beam and jeweler's forceps mandatory. Small-sized diplopods are better to be dissected using insect pins. The dissected parts (mouthparts, antennae, certain appendages) are mounted either as temporary micro-preparations (e.g. in glycerol) or constant slides using such liquid media as Canada balsam (Golovatch, 2004) [37]. The millipedes were identified using their morphological and taxonomical characteristics and species were identified based on the standard keys, available literatures and books.

Result

Collected millipede samples were identified based on the morphological characters such as color, structure of head, antennae, mandibles, gnathochilarium, collum, thoracic shield, tergites, anal shield, legs, female and male sexual characters. The identified millipede species were report in Table 1. Genus richness was differentiated with graphically Graph - 1.

Yelagiri Hills

Swamy Malai – Athanavur

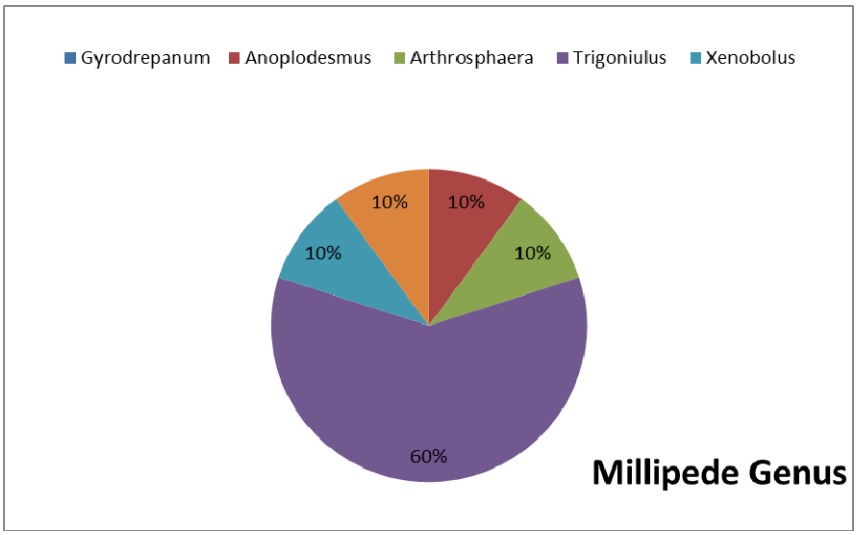


Sample Collected under stone Permanent preservation with label

Plate 1: Sample collection sites, collecting method and preservative

Table 1: Identified millipede species from Yelagiri hills

S. No.	Order	Family	Genus	Species
1	Polydesmida Leach, 1815	Paradoxosomatidae Daday, 1889	*Gyrodrepanum* Carl, 1932	*Gyrodrepanum lamprum* (Chamberlin, 1920)
2			*Anoplodesmus* Carl, 1932	*Anoplodesmus saussurii* (Humbert, 1865)
3	Sphaerotheriida Brandt, 1833	Arthrosphaeridae Jeekel, 1974	*Arthrosphaera* Pocock, 1895	*Arthrosphaera brandtii* (Humbert, 1865)
4				*Arthrosphaera disticta* Pocock, 1895
5				*Arthrosphaera fumosa* Pocock, 1895
6				Arthrosphaera magna Attems, 1936
7				*Arthrosphaera lutescens* (Butler, 1872)
8				*Arthrosphaera thurstoni* Pocock, 1895
9	Spirobolida Bollman, 1893	Pachybolidae Cook, 1897	*Trigoniulus* Pocock, 1894	*Trigoniulus corallinus* (Gervais, 1847)
10			*Xenobolus* Carl, 1919	*Xenobolus carnifex* (Fabricius, 1775)



Graph 1: Pie diagram show the genus richness in Yelagiri hills

Systematic Organization
All Orders, Families, Genera and Species are presented alphabetically for convenience. A brief introduction is provided for each order. Higher Taxa of the Diplopoda recorded from Yelagiri Hills, Eastern Ghats of Tamil Nadu were listed below and species photos were shown in Plate-2.

Order Polydesmida Leach, 1815
These are the true flat-backed millipedes. They have completely fused sclerites and, usually, strong projections on the hind part of each segment. Most have 20 segments (total range 18 to 21) and are blind. Gonopods are formed from the anterior leg pair on segment 7. There are a large number of families in the Polydesmida, which is the largest order of millipedes, containing more than 2700 species. Distributed worldwide, they range in length from 3 mm to 13 cm.

Order Polydesmida Leach, 1815
Family Paradoxosomatidae Daday, 1889
Genus *Anoplodesmus* Carl, 1932
1. *Anoplodesmus saussurii* (Humbert, 1865)
1865 *Polydesmus Saussurii* Humbert, *Mémoires de la Société de Physique et d'Histoire naturelle de Genève*, 18 (1), 1–62

Materials examined: Athanavur, 12.i.2013, Y. Chezhian; Mettukaniyur, 15.iv.2013, Y. Chezhian; Paduvanur, 09.vii.2013, Y. Chezhian; Rayaneri, 13.x.2013, Y. Chezhian; Mangalam, 13.xii.2013, Y. Chezhian.

Distribution: India: Tamil Nadu; West Bengal, Hugli; Ballavpur Reserve Forest near Santiniketan; Howrah, Nischintapur; Bangalore; Malappuram, Kerala. Globally: Sri Lanka, Mascarene Islands (Mauritius), Singapore, Fiji, Vanuatu.

Genus *Gyrodrepanum* Carl, 1932
2. *Gyrodrepanum lamprum* (Chamberlin, 1920)
1932 *Orthromorpha (Gyrodrepanum) bimontana* Carl, *Revue suisse de Zoologie*, 27 (12), 377-404
1936 *Sundanina bimontana* Attems, *Memoirs of the Indian Museum*, 11 (4), 133–323
1968 *Gyrodrepanum bimontanum* Jeekel, *Privately published, Rotterdam, 162*
1972 *Gyrodrepanum lamprum* Jeekel, 1972 *Beaufortia*, 20 (258), 1–6

Materials examined: Thyalur, 13.i.2013, Y. Chezhian; Paduvanur, 17.iv.2013, Y. Chezhian; Kottaiyur, 10.vii.2013, Y. Chezhian; Manchankolli, 15.x.2013, Y. Chezhian; Kottur, 15.xii.2013, Y. Chezhian.

Distributions: India: Tamil Nadu: Anaimalai Hills, Valparai; Nilgiris, Kartery Valley near Coonoor; Madras and Kerala.

Order Sphaerotheriida Brandt, 1833
The so-called giant pill millipede (up to 10 cm in length) is found predominantly in the Southern Hemisphere. They have 13 segments and can roll into complete spheres. In some species, the male can stridulate, producing a sound by rubbing the last legs against the sides of the last tergite.

Order Sphaerotheriida Brandt, 1833
Family Arthrosphaeridae Jeekel, 1974
Genus *Arthrosphaera* Pocock, 1895
3. *Arthrosphaera brandtii* (Humbert, 1865)
1865 *Sphaeropoeus Brandtii* Humbert, *Mémoires de la Société de Physique et d'Histoire naturelle de Genève*, 18 (1), 1–62.
1872 *Zephronia Brandtii* Butler, *Annals and Magazine of Natural History*, Ser. 4, 10, 354–359.
1873 *Zephronia brandtii* Butler, *Proceedings of the Zoological Society of London*, 1873, 172–182
1881b *Sphaeropoeus Brandti* Karsch, *Archive für Naturgeschichte*, 47 (1), 19–35
1892 *Arthrosphaera brandtii* Pocock, *Journal of the Bombay Natural History Society*, 7, 131–174.
1872 *Zephronia chitinoides* Butler, *Annals and Magazine of Natural History*, Ser. 4, 10, 354–359.
1873 *Zephronia chitonoides* Butler, *Proceedings of the Zoological Society of London*, 1873, 172–182
2015 *Arthrosphaera brandtii* Minelli, *The Myriapoda. Vol. 2: Diplopoda. Leiden & Boston, Brill.* 482 p.

Materials examined: Mangalam, 14.i.2013, Y. Chezhian; Manchankolli, 16.iv.2013, Y. Chezhian; Thyalur, 11.vii.2013, Y. Chezhian; Athanavur, 14.x.2013, Y. Chezhian; Rayaneri, 16.xii.2013, Y. Chezhian.

Distribution: India: Tamil Nadu: Madras. Globally: Sri Lanka and Tanzania.

4. *Arthrosphaera disticta* Pocock, 1895
1895 *Arthrosphaera disticta* Pocock, *Annals and Magazine of Natural History*, Ser. 6, 16, 409–415.
1899 *Arthrosphaera disticta* Pocock, *Journal of the Bombay Natural History Society*, 12, 269–285 (for 1898).
1977 *Arthrosphaera distictac* Demange, *Bulletin du Muséum national d'Histoire naturelle,* série 3, Zoologie, 231, 231–235.

Materials examined: Athanavur, 12.i.2013, Y. Chezhian; Mettukaniyur, 15.iv.2013, Y. Chezhian; Paduvanur, 09.vii.2013, Y. Chezhian; Rayaneri, 13.x.2013, Y. Chezhian; Mangalam, 13.xii.2013, Y. Chezhian.

Distribution: India: Tamil Nadu: Sheveroy Hills, Yercaud, Alagarkovil Hills, Kanyakumari (Anayadi and Kodayar) and Tirunelveli (Kalakad and Thalayanai) districts; Kerala: Cannanore; Karanataka: Shankaraghatta, Payyannur.

5. *Arthrosphaera fumosa* Pocock, 1895
1895 *Arthrosphaera fumosa* Pocock, *Annals and Magazine of Natural History*, Ser. 6, 16, 409–415.
1899a *Arthrosphaera fumosa* Pocock, *Journal of the Bombay Natural History Society*, 12, 269–285 (for 1898).

Materials examined: Pallakaniyur, 12.i.2013, Y. Chezhian; Kottaiyur, 15.iv.2013, Y. Chezhian; Nilavur, 09.vii.2013, Y. Chezhian; Rayaneri, 13.x.2013, Y. Chezhian; Athanavur, 15.xii.2013.

Distribution: India: Tamil Nadu: Coimbatore; Western Ghats; Karanataka: Karike.

6. *Arthrosphaera lutescens* (Butler, 1872)
1872 *Zephronia lutescens* Butler, *Annals and Magazine of Natural History*, Ser. 4, 10, 354–359.
1873 *Zephronia lutescens* Butler, *Proceedings of the Zoological Society of London*, 1873, 172–182.
1899a *Arthrosphaera lutescens* Pocock, *Journal of the Bombay Natural History Society*, 12, 269–285 (for 1898).

Materials examined: Mangalam, 14.i.2013, Y. Chezhian; Manchankolli, 16.iv.2013, Y. Chezhian; Thyalur, 11.vii.2013, Y. Chezhian; Athanavur, 14.x.2013, Y. Chezhian; Rayaneri, 16.xii.2013, Y. Chezhian.

Distribution: India: Tamil Nadu; Kerala: Maddathoray; Kulatupuzha, Western Ghats, Travancore; Karnataka State.

7. *Arthrosphaera magna* Attems, 1936
1936 *Arthrosphaera magna* Attems, *Memoirs of the Indian Museum*, 11 (4), 133–323.

Materials examined: Athanavur, 12.i.2013, Y. Chezhian; Mettukaniyur, 15.iv.2013, Y. Chezhian; Paduvanur, 09.vii.2013, Y. Chezhian; Rayaneri, 13.x.2013, Y. Chezhian; Mangalam, 13.xii.2013, Y. Chezhian. Mangalam, 14.i.2013, Y. Chezhian; Manchankolli, 16.iv.2013, Y. Chezhian; Thyalur, 11.vii.2013, Y. Chezhian; Athanavur, 14.x.2013, Y. Chezhian; Rayaneri, 16.xii.2013, Y. Chezhian.

Distributions: India: Tamil Nadu: Shevaroy Hills, West Bengal: Bombay Presidency, S. India; Karnataka: Adyanadka; Maharashtra: Khandala, Lonavla, Phonda ghat, Kolhapur; Andhra Pradesh: Rajamandri.

8. *Arthrosphaera thurstoni* Pocock, 1895
1895 *Arthrosphaera Thurstoni* Pocock, *Annals and Magazine of Natural History*, Ser. 6, 16, 409–415.
1899a *Arthrosphaera Thurstoni* Pocock, *Journal of the Bombay Natural History Society*, 12, 269–285 (for 1898).
1936 *Arthrosphaera thurstoni* Attems, *Memoirs of the Indian Museum*, 11 (4), 133–323.

Materials examined: Thyalur, 13.i.2013, Y. Chezhian; Paduvanur, 17.iv.2013, Y. Chezhian; Kottaiyur, 10.vii.2013, Y. Chezhian; Manchankolli, 15.x.2013, Y. Chezhian; Kottur, 15.xii.2013, Y. Chezhian.

Distributions: India, Nilgiri Hills; Dimhutti, near Kotagiri, Nilgiri Hills; Yercaud, Shevaroy Hills.

Order Spirobolida Bollman, 1893
This order is distinguished by a pronounced suture that runs vertically down the front of the head. Both pairs of legs on the seventh segment of the male are modified into gonopods. The spirobolids are generally tropical species, some of which are very brightly coloured (Lewis 1984).

Order Spirobolida Bollman, 1893
Family Pachybolidae Cook, 1897
Genus *Trigoniulus* Pocock, 1894
9. *Trigoniulus corallinus* (Gervais, 1847)
1977a *Trigoniulus goesi* Demange, Bulletin *du Muséum national d'Histoire naturelle,* série 3, Zoologie, 231, 231–235.
1936 *Trigoniulus lumbricinus* Attems, *Memoirs of the Indian Museum*, 11 (4), 133–323.
1985 *Trigoniulus corallinus* Tikader & Das, *Calcutta*, *Zoological Survey of India, 87.*

Materials examined: Athanavur, 12.i.2013, Y. Chezhian; Mettukaniyur, 15.iv.2013, Y. Chezhian; Paduvanur, 09.vii.2013, Y. Chezhian; Rayaneri, 13.x.2013, Y. Chezhian; Mangalam, 13.xii.2013, Y. Chezhian; Mangalam, 14.i.2013, Y. Chezhian; Manchankolli, 16.iv.2013, Y. Chezhian; Thyalur, 11.vii.2013, Y. Chezhian; Athanavur, 14.x.2013, Y. Chezhian; Rayaneri, 16.xii.2013, Y. Chezhian.

Distribution: : India, various places: Kerala; Bengal, Calcutta (= Kolkata), Behala and Dakhindari; Bihar, Pusa; Andaman Islands; Pollachi; Nilgiris, Coonoor; Nasinigudi; Anaimala Hills, Attakatti; Assam, Cinnamara.

Genus *Xenobolus* Carl, 1919
10. *Xenobolus carnifex* (Fabricius, 1775)
1781 *Iulus carnifex* Fabricius, *Species Insectorum etc*. Hamburgi & Kilonii, 1, i–viii; 552 p.
1788 *Julus Carnifex* Linnaeus, Editio *decima tertia, aucta, reformata. Lipsiae*, 1, 3910 p.
1781 *Julus carnifex* Fabricius, *Species Insectorum etc*. Hamburgi & Kilonii, 1, i–viii; 552 p.
1781 *Iulus carnifex* Fabricius, *Species Insectorum etc*. Hamburgi & Kilonii, 1, i–viii; 552 p.
1841b *Julus (Spirobolus) carnifex* Brandt, *Bulletin scientifique publié par l'Académie Impériale des Sciences de St. Pétersbourg*, 8, 365–370.
1844a *Spirobolus ruficollis* Newport, *Annals and Magazine of Natural History*, 13, 263–270.
1847 *Iulus ruficollis* Gervais, *Histoire naturelle des Insectes. Aptères.* Paris, Roret, 4, 623 p.
1847 *Spirobolus Carnifex* Koch, *Myriapoden und Arachniden*. Regensburg, 1–40, 272 p.
1847 *Spirobolus carnifex* Karsch, 1881a *Zeitschrift für die gesammten Wissenschaften*, 54, 1–79
1896a *Trigoniulus carnifex* Silvestri, *Annali del Museo Civico di Storia Naturale di Genova*, Ser. 2, 16 (36), 21–28.
1897 *Diaphoropus carnifex* Silvestri, *Annales de la Société Entomologique de Belgique*, 41, 345–362.
1919 *Xenobolus carnifex* Carl, *Revue suisse de Zoologie*, 27 (12), 377–404.

Materials examined: Athanavur, 12.i.2013, Y. Chezhian; Mettukaniyur, 15.iv.2013, Y. Chezhian; Paduvanur, 09.vii.2013, Y. Chezhian; Rayaneri, 13.x.2013, Y. Chezhian; Mangalam, 13.xii.2013, Y. Chezhian; Pallakaniyur, 12.i.2013, Y. Chezhian; Kottaiyur, 15.iv.2013, Y. Chezhian; Nilavur, 09.vii.2013, Y. Chezhian; Rayaneri, 13.x.2013, Y. Chezhian; Athanavur, 15.xii.2013.

Distribution: Sri Lanka, Malaysia (Borneo) and also India, Tranquebar; Madras, Shevaroy Hills, Yercaud; Central Provinces, Chanda.

Arthrosphaera disticta Pocock, 1895

Arthrosphaera fumosa Pocock, 1895

Arthrosphaera thurstoni Pocock, 1895

Arthrosphaera lutescens (Butler, 1872)

Arthrosphaera brandtii (Humbert, 1865)

Arthrosphaera magna Attems, 1936

Gyrodrepanum lamprum (Chamberlin, 1920)

Anoplodesmus saussurii (Humbert, 1865)

Trigoniulus corallinus (Gervais, 1847)

Xenobolus carnifex (Fabricius, 1775)

Plate 2

Discussion

In the context of paucity of information on the diversity and distribution of species of millipede in South India, it is very difficult to discuss in depth the diversity profile of this taxonomically poorly known and least explored group in South India in spite of their vital role as good decomposers especially in forest ecosystems in montane areas. Present study has recorded ten species of millipede in Yelagiri hills of Eastern Ghats whereas Alagasam and Ramanathan (2013) have recorded a maximum of five species in Alagar hills

Reserve forest in Southern end of Eastern Ghats. Only four species of millipedes were recorded in Rajgurunagar along the Northern Western Ghats (C. R. Choudhari *et al.,* 2014) [35]. Unfortunately the biodiversity rich middle and southern Western Ghats have received scanty attention with regard to millipede diversity notwithstanding the fact they however several endemic and phylogenetically significant species in related taxa. There is an urgent need for intensive inventorying and monitoring of millipedes in different habitats especially in the montane forest of Southern India in order to promote effective conservation of this sensitive taxon as part of a holistic strategy of macro-invertebrate conservation.

Acknowledgement
The authors are grateful to the Director, Zoological Survey of India, Kolkata and Officer-in- Charge, Southern Regional Centre, Zoological Survey of India, Chennai for their support and encouragements and Tamil Nadu Forest Department, Vellore district, for his constant support and providing the necessary facilities.

Reference

1. Achar KP. Analysis of male meiosis in seven species of Indian pill-millipedes (Diplopoda: Myriapoda). Caryologia, 1986; 39(1):89-101.
2. Alagesan P, Ganga G. Millipedes as potential pests of tuber crops. Indian Journal of Experimental Biology. 1989; 27:177-179.
3. Alagesan P, Muthukrishnan J. Effect of temperature on yolk utilisation and rate of development in *Xenobolus carnifex* (Fabricius) (Diplopoda: Spirobolida). African Invertebrates, 2003; 44(1):313-323.
4. Alagesan, P, Muthukrishnan J. Ecological energetics of the millipede, *Xenobolus carnifex* (Fabricius). Acta Arachnologica, 2005a; 54(1):5-12.
5. Alagesan P, Muthukrishnan J. Bioenergetics of the household millipede pest, *Xenobolus carnifex* (Fabricius, 1775) (Diplopoda: Spirobolida). Peckiana, 2005b; 4:3-14.
6. Alagesan P, Muthukrishnan J. Population dynamics of the millipede, *Xenobolus carnifex* (Diplopoda: Spirobolida), in a unique habitat. In: Roble, S.M. & Mitchel, J.C. (Eds). A lifetime of contributions to myriapodology and the natural history of Virginia: A festschrift in honor of Richard L. Hoffman's 80th birthday. Virginia Museum of Natural History Special Publication, 2009; 16:237-243.
7. Alagesan P, Ramanathan B. Diversity of millipedes in Alagar Hills Reserve Forest in Tamil Nadu, India. International Journal of Biodiversity. 2013, 1-5. ID 715460,
8. Alagesan P, Ashokkumar B, Muthukrishnan J, Gunasekaran P. Isolation and characterization of gut bacteria of the millipede, *Xenobolus carnifex* (Fabricius). Indian Journal of Microbiology. 2003; 43(2):111-113.
9. Ambarish CN, Sridhar KR. Production and quality of pill-millipede manure: A microcosm study. Agricultural Research, 2013a; 3(2):258-264.
10. Ambarish CN, Sridhar KR. Observations on pill-millipedes of the Western Ghats (India). Journal of Agricultural Technology. 2013b; 9(1):61-79.
11. Ambarish CN, Sridhar KR. Do the giant pill-millipedes (*Arthrosphaera*: Sphaerotheriida) disseminate arbuscular mycorrhizal spores in the Western Ghats Symbiosis, 2014b. DOI 10.1007/s13199-014-0306-y
12. Ambarish CN, Sridhar KR. Moulting behaviour of the giant-millipedes (Sphaerotheriida: *Arthrosphaera*) of the Western Ghats of India: an ex situ study. Lepcey – The Journal of Asian Tropical Entomology. 2014c; 03(1):12-22.
13. Ambarish CN, Sridhar KR. Microbial dynamics in food, intestine and fecal pellets of two endemic pill-millipedes (*Arthrosphaera*: Sphaerotheriida) of the Western Ghats. Journal of Agricultural Technology. 2015a; 11(3):637-648.
14. Ambarish CN, Sridhar KR. Stridulation and courtship behaviour of four endemic pill-millipedes, *Arthrosphaera* spp. (Sphaerotheriida: Arthrosphaeridae) of the Western Ghats of India. Proceedings of the Zoological Society, Kolkata, 2015b; 1-10.
15. Ambarish CN, Sridhar KR. Pill-millipedes (*Arthrosphaera*: Sphaerotheriida) of the Western Ghats: a future source of antioxidants International Journal of Tropical Insect Science. 2015c; 35(3):117-124.
16. Ambarish CN, Sridhar KR. Pattern of distribution of endemic pill-millipedes in the southwestern India. Proceedings of the Zoological Society, Kolkata, 2015d, 1-8.
17. Ashwini KM. Sridhar KR. Towards organic farming with millipede Arthrosphaera magna. Current Science, 2002; 82(1):20-22.
18. Ashwini KM, Sridhar KR. Leaf litter preference and conversion by a saprophagous tropical pill millipede, Arthrosphaera magna Attems. Pedobiologia, 2005; 49(4)307-316.
19. Ashwini KM, Sridhar KR. Breakdown of plantation residues by pill millipedes (*Arthrosphaera magna*) and assessment of compost quality. Current Science, 2006a; 90(7)954-959.
20. Ashwini KM. Sridhar KR. Seasonal abundance and activity of pill millipedes (*Arthrosphaera magna*) in mixed plantation and semi-evergreen forest of southern India. Acta Oecologica, 2006b; 29:27-32.
21. Ashwini KM, Sridhar KR. Evaluation of pill millipede (*Arthrosphaera magna*) compost on plant growth and dry matter yield. Electronic Journal of Environmental, Agricultural and Food Chemistry. 2006c; 5(2):1323-1329.
22. Ashwini KM, Sridhar KR. Feeding response of an endemic pill millipede *Arthrosphaera magna* Attems to plantation litter. Journal of Plantation Crops. 2006d; 34(1):58-62.
23. Ashwini KM, Sridhar KR. Distribution of pill millipedes (*Arthrosphaera*) and associated soil fauna in the Western Ghats and west coast of India. Pedosphere, 2008; 18(6):749-757.
24. Attems C. Myriopoden von Sumatra. Archiv für Hydrobiologie, Suppl, 1935; 14(1):114-142.
25. Attems C. Diplopoda of India. Memoirs of the Indian Museum, 1936; 11(4):133-323.
26. Bai MM. Note on the millipede, *Phyllogonostreptus nigrolabiatus* a biodegradator in South Arcot District, Tamil Nadu. Records of the Zoological Survey of India, 1997a; 96(1-4):245-246.

27. Bai MM. Millipede (Diplopoda). Fauna of Nilgiri Biosphere Reserve. Zoological Survey of India. Fauna of Conservation Areas Series, 2001; 10:45-53.
28. Bai MM, Indra TJ. Report on the millipede fauna of South Arcot District, Tamil Nadu. Records of the Zoological Survey of India, 1997; 96(1-4):229-235.
29. Bano K. The role of the millipede *Jonespeltis* splendidus Verhoeff in an ecosystem (Diplopoda, Polydesmida, Paradoxosomatidae). Berichte des *Naturwissenschaftlich-medizinischen Vereins* in Innsbruck, Suppl, 1992; 10:327-331.
30. Bano K. Records of paradoxosomatid millipedes of India. Mémoires du Muséum national d'Histoire naturelle, 1996a; 169:73-77.
31. Bano K. Check list of paradoxosomatid millipedes of India. Abstracts, Conservation Assessment and Management Plan (C.A.M.P) Workshop for Biodiversity Conservation Prioritization Project (B.C.P.P.) for Selected Soil Invertebrates of Southern India. Zoological Survey of India, Chennai, 1997, 12.
32. Bano K. Distinguishing characteristics and systematic positions of the known Indian paradoxosomatid millipedes. Proceedings of the Zoological Society of Calcutta, 1998a; 51(1):86-91.
33. Bano K. Taxonomic review of the family Harpagophoridae (Diplopoda: Spirostreptida): characteristics of the Indian genera and a check-list of Indian species. Proceedings of the Zoological Society of Calcutta, 1998b; 51(2):183-187.
34. Brade-Briks SG. Presidential address: retrospect and prospect in myriapodology. Symposia of Zoological Society of London, 1974; 32:1-3.
35. Choudhari CR, Dumbare YK, Theurkar SV. Diversity of millipedes along the Northern Western Ghats, Rajgurunagar (MS), India (Arthropod: Diplopod); Journal of Entomology and Zoology Studies. 2014; 2(4):254-257.
36. Fabricius IC. Systema entomologiae etc. Flensburgi & Lipsiae, 1775, 832.
37. Golovatch SI, Elena Mikhaljova V. The Millipedes (Diplopoda) of the Asian Part of Russia; Pensoft Publishers, 2004, 10-36.
38. Kadamannaya BS, Sridhar KR. Leaf litter ingestion and assimilation by two endemic pill millipedes (*Arthrosphaera*). Biology and Fertility of Soils, 2009a; 45:761-768.
39. Kadamannaya BS, Sridhar KR. Diurnal periodicity of three endemic species of pill millipedes (*Arthrosphaera*) in Western Ghats, India. Tropical and Subtropical Agroecosystems, 2009b; 10(3):505-513.
40. Kadamannaya BS, Sridhar KR, Seena S. Seasonal periodicity of pill millipedes (*Arthrosphaera*) and earthworms of the Western Ghats, India. World Journal of Zoology. 2009; 4(2):63-69.
41. Kadamannaya BS, Ambarish CN, Sridhar KR. Morphological features of three endemic pill-millipedes of the genus Arthrosphaera in the Western Ghats of India. Animal Biology Journal. 2012; 3(4):181-193.
42. Karthigeyan M Alagesan P. Millipede composting: A novel method for organic waste recycling. Recent Research in Science and Technology, 2011; 3(9):62-67.
43. Krishnan G. The millipede Thyropygus with special reference to Indian species. CSIR Zoological Memoirs on Animal Types, 1. Publications and Information Directorate, Council of Scientific and Industrial Research, Rafi Marg, New Delhi, 1968, 84.
44. Newport G. A list of the species of Myriapoda, order Chilognatha, contained in the cabinets of the British Museum, with descriptions of a new genus and thirty-two new species. Annals and Magazine of Natural History, 1844a; 13:263-270.
45. Newport G. List of the specimens of Myriapoda in the collection of the British Museum. London, 1844b; I:vi-15.
46. Nguyen DA. The millipede genus *Anoplodesmus* Pocock, 1895 in Vietnam (Diplopoda: Polydesmida: Paradoxosomatidae). Zootaxa, 2010; 2649:52-60.
47. Nguyen DA, Sierwald P. A worldwide catalogue of the family Paradoxosomatidae Daday, 1889 (Diplopoda: Polydesmida). Check List, 2013; 9(6):1132-1353.
48. Ramanathan B, Alagesan P. Population dynamics of two millipedes in Alagarmalai Hills of Tamil Nadu. World Journal of Zoology. 2011; 6(4):364-369.
49. Ramanathan B, Alagesan P. Isolation, characterization and role of gut bacteria of three different millipede species. Indian Journal of Scientific Research. 2012a; 3(2):55-61.
50. Ramanathan B, Alagesan P. Evaluation of millicompost versus vermicompost. Current Science, 2012b; 103(2):140-143.
51. Stephen Hopkin P, Helen Read j. The Biology of Millipedes, Oxford University Press, 1992, 1-227.
52. William Shear. An outline of higher-level classification and survey of taxonomic richness; Zootaxa 2011; 159:164-169.