Eco. Env. & Cons. 26 (4) : 2020; pp. (1826-1833)
Copyright@ EM International
ISSN 0971–765X

An annotated checklist of Terrestrial Isopod Fauna (Crustacea : Isopoda) of India

Shahnaz Tabassum, Santanu Mitra[2] and Seema Langer[1]

[1]Department of Zoology, University of Jammu, Jammu 180 006, J & K, India
[2]Zoological survey of India, F.P.S. Building, 27, J.L. Nehru Road, Kolkata 700 016, India

(Received 11 March, 2020; Accepted 22 April, 2020)

ABSTRACT

The present study is an attempt to compile the list of terrestrial isopods found in India to this date, which are mentioned in various published literature. A total of 78 species belonging to 30 genera and 14 families are here in listed from Indian states. The highest number of species, genera and family are found from Tamil Nadu and Andaman and Nicobar and the least are found from Gujarat and Jharkhand. The highest number of species reported belongs to the genus *Cubaris* (17 species) followed by genus *Adinda* (8 species) and then genus *Philoscia* with 5 species. Compared to their importance, very little number of studies have been conducted on the terrestrial isopods in India.

Key words : *Tamil Nadu, Terrestrial isopods, Cymothoidea, Oniscidea, Cubaris*

Introduction

Isopoda is one of the most specialized group of crustaceans which has adapted to diverse mode of life. They are predominantly marine but estuarine and freshwater forms are also well-represented. The suborder Oniscidea contains a large number of crustaceans which are truly terrestrial. They may be free-living, parasitic, predators, filter predators, scavengers, wood-boring, myrmecophilous or cavernicolous. Their size ranges from 300 micrometer (Microcerberidae) to about 50 centimeters (as in *Bathynomus*).

Compared to prawns, crabs and lobsters, this group of crustaceans is poorly studied by zoologists or even less surveyed in many parts of the world although some parasitic and wood-boring forms cause considerable damage, loss to fisheries, wooden jetties and few others isopods act as pollution indicators. Isopods often cause damage to agricultural crops. One species of isopod, *Philoscia sacchari* has been reported to attack and damage sugarcane buds (David, 1967) in Tanjore district of Tamil Nadu. However, there are folklores which show some of the isopods with positive qualities. It is held that the presence of isopods in fishes indicate that the fish is free from ciguatera (fish poisoning) toxins (not tested). Dried isopods are used as folklore medicines in many parts of the world.

The order Isopoda which comprises of nine suborders containing about 11, 000 species, of which, eight suborders namely, Asellota, Cymothoidea, Limnoridea, Microcerberidea, Oniscidea, Phreatoicoidea, Sphaeromatoidea and Valvifera containing 35 families are herein reported from India (Dev Roy, 2013). Marine and estuarine isopods are well documented in Indian literature; Dev Roy (2013) listed a total 232 species under 101 genera and 25 families from different estuaries in east and west coast from India. Relatively the work on terrestrial isopods is very scattered, and a comprehensive work on this group deals with only 30 species of 9

genera (Ramakrishna, 1995).

In the present communication, a check-list of 78 species of isopods has been prepared providing recent generic and species names of the group as far as possible. State-wise distribution of terrestrial isopods in India has been presented here. The present communication serves a base line data for this group and may help the future worker on taxonomical or ecological studies.

Review of literature

Earlier Budde-Lund (1879) described two species viz., *Tylosalbidus* (Tylidae) and *Spherillo nicobaricus* (Armadillidae) from Nicobar Islands.

After a short gap, Stebbing (1907) initiated the study of Indian Isopods with the description of a new species of the genus *Tachaea* from Calcutta. In 1911, he gave a detailed account of Indian isopods and dealt with two genera of the tribe Flabellifera and five genera of the tribe Oniscoidea (terrestrial). Two genera *viz., Parapericyphis* and *Exalloniscus* were erected by him as new to science.

Collinge entered the field and made several contributions which received adequate attention. Collinge (1914b, c) published an account of three species pertaining to three genera *viz., Philoscia, Parapericyphis and Cubaris* collected from Port Blair, Andamans and from the Annamalai Hills about 4000 ft. above the sea level. He again (1912-22) contributed two papers on the terrestrial isopods which were obtained from the Abor expedition. While working out the material, he came across two genera new to science viz., *Rotungus* and *Burmoniscus*, the former was obtained from Kobo, Abor country (present day Arunachal Pradesh) at an altitude of 400 ft. and the later from the caves near Moulmein (Myanmar). Apart from these two genera, he has also described six other species of which, three are discovered for the first time. His next contribution to our knowledge of terrestrial isopods of India dates back to 1914, when he worked out the collection received from Madras Province. Of the ten species dealt with nine species were new to science. *Ennurensis hispidus* and *Hemiporcellio carinatus* stand significant among this collection. In 1916, Collinge described 13 new species of the genera *Parapericyphis, Cubaris,* and *Burmoniscus*. Among these, *Burmoniscus kempi* was collected from Maosmai cave near Cherrapunji at an altitude of 4,000 ft.

Chopra (1924a) while working on the isopod fauna of Siju cave described two species of terrestrial isopods belonging to the family Oniscidae. In the same year (1924b) he also described two myrmecophilous isopods from Barkuda Islands, Chilka Lake, Odisha. Of these two species, *Cubaris granulatus* was not known to be associated with ants earlier. Verhoeff (1936a) dealt with several species of terrestrial Isopods collected from Madras and other parts of south India. He further described a new species of the genus *Protracheoniscus* from Ladakh (1936b). Chopra (1947) reported about the occurrence of the ancient suborder Phreatoicoidea (Crustacea: Isopoda) for the first time from India based on collection from a Pucca well at Lohagara Railway station, 18 miles from Allahabad. Later, several specimens of this species were collected from the wells at Banaras (Uttar Pradesh). In 1950, Chopra and Tiwari described the genus *Nichollsia kashiense* from the material collected from the well in the outer lawn of the Kaiser Castle, Banaras Cantt. Later, Tiwari (1955) described another new species of *Nichollsia*, viz., *Nichollsia menoni* collected from an abandoned well at Monghyr (Bihar). In 1955, he erected a new family Nichollsidae to accommodate the genus *Nichollsia*.

Ramakrishna (1965) recorded several species of terrestrial isopods from Kameng Division of the North Eastern Frontier Agency (present day Arunachal Pradesh). In 1969, he described a new species of *Philoscia* based on materials collected from a pit and the surrounding galleries of Lodna Colliery, 13 km from Dhanbad, Bihar (now in the state of Jharkhand). Some terrestrial isopods of India have been investigated by Ram and Kumar (1979).

In recent times, several workers, Ferrara and Taiti (1982) and Ferrara *et al*. (1995) also studied terrestrial isopods of India, including Andaman and Nicobar Islands, and described several new species.

Results and Discussion

The recent review implies that, there are only 78 species of terrestrial isopods belonging to 2 suborder, 14 families and 30 genera are reported from this country (Table 1). Results suggest that Tamil Nadu reaches highest number of species diversity; followed by Kerala, Andaman & Nicobar Islands, Odisha and West Bengal (Table 2). There are many states like Gujarat, Jharkhand, Lakshadweep, Manipur and Punjab from where very few terres-

Table 1. Distributional list of all terrestrial isopods in India

Distribution	Name of the species
Suborder ONISCIDEA	
Family AGNARIDAE Schmidt, 2003	
***Agnara* Budde-Lund, 1908**	
Odisha: Chilka lake, Rambha, Ganjam dist. (Collinge, 1915)	1. *Agnara carinata* (Collinge, 1915)
Odisha: Satpara, Chilka lake (Collinge, 1915)	2. *Agnara hispida* (Collinge, 1915)
Uttar Pradesh: Allahabad (Collinge, 1914)	3. *Agnara immsi* (Collinge, 1914)
***Alloniscus* Dana, 1854**	
Nicobar Island (Budde-Lund, 1885); Northeast India (Taiti, 2014)	4. *Alloniscus nicobaricus* (Budde-Lund, 1885)
Odisha: Chilika (Chilton, 1916); Andaman & Nicober Island (Budde-Lund, 1885), Lakhshadweep (Taiti, 2014)	5. *Alloniscus pigmentatus* (Budde-Lund, 1885)
***Protracheoniscus* Verhoeff, 1917**	
Uttar Pradesh: Lucknow (Stebbing, 1911)	6. *Protracheoniscus asiaticus* (Uljanin, 1875)
Jammu and Kashmir: Ladak (Nubra, Shylok and Khardung valley) (Jackson, 1935)	7. *Protracheoniscus Karakorum* (Jackson, 1935)
Jammu and Kashmir: Karghalik and Yarkand (Ramakrishna, 1995)	8. *Protracheoniscus maracandicus* (Uljanin, 1875)
Jammu and Kashmir: Ladak (Verhoeff, 1936)	9. *Protracheoniscus nivalis*(Verhoeff, 1936)
Family ARMADILLIDAE Brandy, 1831	
***Cubaris* Brandt, 1833**	
Andhra Pradesh: Kamalapuram (Collinge, 1916)	10. *Cubaris albolateralis* (Collinge, 1916)
Meghlaya: caves of Cherrapunji (Collinge, 1916)	11. *Cubaris cavernosa* (Collinge, 1916)
Kerala: Puenjikara island, near Ernakulam, Kochi (Collinge, 1916);	12. *Cubaris chiltoni* (Collinge, 1916)
West Bengali: Kalimpong, Darjeeling dist. (Collinge 1916);	13. *Cubaris dilectum* (Collinge, 1916)
Odisha: Barkuda Island, Chilka lake, Ganjam dist. (Collinge, 1916);	14. *Cubaris expansa* (Collinge, 1916)
Odisha: Rambha, Chilka lake, Ganjam dist. (Collinge 1915); Tamil Nadu: Madras (Collinge, 1915); Odisha: Balugaon, Barkuda island (Chopra, 1924)	15. *Cubaris granulata* (Collinge, 1915)
Jharkhand: Pass between ChaibassaandChakardharpur, Chotanagpur (Collinge, 1916);	16. *Cubaris gravelii* (Collinge, 1916)
Jammu & Kashmir: Sringar (Verhoeff, 1936)	17. *Cubaris ignota* (Arcangeli, 1934)
Jammu & Kashmir: Sringar (Jackson, 1935)	18. *Cubaris kashmiri* (Jackson, 1935)
Kerala: Parambiculam, Kochi (Collinge, 1916)	19. *Cubaris lobata* (Collinge, 1916)
Arunachal Pradesh: Kobo (Collinge, 1916); Kemang division (Ramakrishna, 1965)	20. *Cubaris marmorata* (Collinge, 1916)
Andaman island: Port blair (Collenge, 1915);	21. *Cubaris murina* (Brandt, 1833)
Odisha: Rambha, Ganjam dist. (Collinge, 1915)	22. *Cubaris nacrum* (Collinge, 1915)
Bihar: Patna (Ram & Kumar, 1979)	23. *Cubaris pataliputraensis* (Ram & Kumar, 1979)
Maharashtra: Kas, Satara dist., Bombay pres. (Collinge, 1916);	24. *Cubaris pusilla* (Collinge, 1916)
Assam: Sadyia (Collinge, 1914)	25. *Cubaris robusta* (Collinge, 1914)
Karnataka: Oorgaum, Kolar dist. (Collinge, 1915)	26. *Cubaris solidula* (Collinge, 1915)
***Hybodillo* Taiti, Paoli & Ferrara, 1998**	
Andaman Island (Ferrera and Taiti, 1982)	27. *Hybodillo monocellatus* (Ferrara & Taiti, 1982)
Laureola Barnard, 1960	
Kerala: Travancore (Kwon, Ferrara & Taiti, 1993)	28. *Laureola indica* Kwon, (Ferrara & Taiti, 1992)
Madrasdillo Arcangeli, 1957	
Tamil Nadu: Madras (Kwon, Ferrara & Taiti, 1993)	29. *Madrasdillo elevatus* (Verhoeff, 1936)
Nesodillo Verhoeff, 1926	
Kerala: Kovalam (Verhoeff, 1936)	30. *Nesodillo jonesi* (Verhoeff, 1936)
West Bengal: Darjeeling (Verhoeff, 1928)	31. *Nesodillos chellenbergi* (Verhoeff, 1928)

Table 1. *Continued ...*

Distribution		Name of the species
***Spherillo* Dana, 1853**		
Nicobar Island (Budde-Lund, 1879)	32.	*Spherillo nicobaricus* (Budde-Lund, 1885)
Family Eubelidae Budde-Lund, 1899		
***Saidjahus* Budde-Lund, 1904**		
Mandapam, Pamban passage, Tamil Nadu (Stebbing, 1911)	33.	*Saidjahus* sp. (Budde-Lund,1904)
Family HALOPHILOSCIIDAE Verhoeff, 1908		
***Littorophiloscia* Hatch, 1947**		
Andaman island (Ferrara & Taiti, 1982)	34.	*Littorophiloscia denticulata* (Ferrara & Taiti, 1982)
Family LIGIIDAE Leach, 1814 *Ligia* Fabricius, 1798		
Andaman & Nicober Is. (Ferrera and Taiti, 1982)	35.	*Ligia dentipes* (Budde-Lund, 1885)
Along the coast of India (Ferrera and Taiti, 1982)	36.	*Ligia (Megaligia) exotica* (Roux, 1828)
Ligidium Brandt, 1833		
Andhra pradesh: Vishakhapatnam (Kumari, Hanumantha-Rao & Shyamasundari, 1989)	37.	*Ligidum rishikondensis* (Kumari, Hanumantha-Rao & Shyamasundari, 1989)
Family OLIBRINIDAE Budde-Lund, 1913		
***Olibrinus* Budde-Lund, 1913**		
Nicober island (Barnard, 1936)	38.	*Olibrinus antennatus* (Budde-Lund, 1902)
Family ONISCIDAE Latreille, 1806 *Exalloniscus* Stebbing, 1911		
Kerala: Madathorai (Ramakrishna, 1995)	39.	*Exalloniscus coecus* (Dollfus, 1898)
***Rotungus* Collinge, 1916**		
Arunachal Pradesh: Kobo (Collinge, 1916; Ramakrishna, 1995).	40.	*Rotungus pictus* (Collinge, 1916)
Family PHILOSCIIDAE Kinahan, 1857		
Anchiphiloscia Stebbing, 1908		
Andaman Island (Ferrera and Taiti, 1982)	41.	*Anchiphiloscia bicolorata* (Ferrara & Taiti, 1982)
Andaman Island (Ferrara and Taiti, 1982)	42.	*Anchiphiloscia longisetosa* (Ferrara & Taiti, 1982)
***Arhina* Budde-Lund, 1904**		
Odisha: Barkul, Chilka lake (Collinge, 1915);	43.	*Arhina barkulensis* (Collinge, 1915)
Burmoniscus Collinge, 1914		
Arunachal Pradesh, West Bengal, Madhya Pradesh, Uttar Pradesh, Himachal Pradesh, Haryana, Silent Valley in Kerala, Tamil Nadu, Karnataka, Goa and Nicobar-Islands (Ramakrishna, 1995)	44.	*Burmoniscus javanensis* (Richardson, 1922)
Meghalaya: Maosmai Cave, Cherrapunji (Collinge, 1916; Ramakrishna, 1995)	45.	*Burmoniscus kempi* (Collinge, 1916
***Dekanoscia* Verhoeff, 1936**		
Tamil Nadu: Madras, Kerala: Ponmudi Hills (Verhoeff, 1936)	46.	*Dekanoscia longicornis* (Verhoeff, 1936)
***Philoscia* Latreille, 1804**		
Philoscia Latreille, 1804		
Meghalaya: Siju Cave, Garo Hills (Ramakrishna, 1995);	47.	*Philoscia dobakholi* (Chopra, 1924)
Kerala: Silent Valley (Ramakrishna, 1995);	48.	*Philoscia indirae*(Ramakrishna, 1995)
Bihar: Lodna colliery, 13 km. from Dhanbad (Ramakrishna, 1995); Arunachal Pradesh, Assam, Meghalaya, Manipur, Madhya Pradesh, Rajasthan, Orissa, West Bengal, Kerala, Tamil Nadu, Karnataka, Maharashtra and Goa (Ramakrishna, 1995);	49.	*Philoscia lodnensis* (Ramakrishna, 1969)
Arunachal Pradesh: Kemang division (Ramakrishna 1965, 1995);	50.	*Philoscia muscorum* (Scopoli, 1763)
Tamil Nadu: Tanjore (David, 1967)	51.	*Philoscia sacchari* (David, 1967)
Tamil Nadu (Collinge, 1915)	52.	*Philoscia tenuissima* (Collinge, 1915)
Family PLATYARTHRIDAE Verhoeff, 1949		
***Platyarthrus*Brandt, 1833**		
Odisha: Barakuda island, Chilka lake (Chopra, 1924);	53.	*Platyarthrus acropyga* (Chopra, 1924)

Table 1. *Continued ...*

Distribution	Name of the species
Family PORCELLIONIDAE Brandt & Ratzeburg, 1831	
***Ennurensis* Collinge, 1915**	
Tamil Nadu: Ennur near Madras (Collinge, 1915, Ramakrishna, 1995), Mandapam, Pamban passage (Ramakrishna, 1995); Odisha: Satpara, Chilka lake (Ramakrishna, 1995);	54. *Ennurensis hispidus* (Collinge, 1915)
***Porcellio* Latreille, 1804**	
Meghalaya: MlawailExamulSiju cave, Garo hill (Chopra, 1924); Arunachal Pradesh: Kamengdivison (Ramakrishna, 1965); Arunachal Pradesh, Assam, Manipur, Bihar, Orissa, Madhya Pradesh, West Bengal, Kerala, Tamil Nadu, Karnataka, Goa and Andaman & Nicobar Islands (Ramakrishna, 1995)	55. *Porcellio assamensis* (Chopra, 1924)
Rajasthan: Tolla Berra, about 5 kms. From Pokran on Ramdeora Road (Ramakrishna, 1975, 1995); Maharashtra, Andhra Pradesh and Tamil Nadu (Ramakrishna, 1995)	56. *Porcellio ganesa* (Ramakrishna, 1975)
West Bengal, Bihar Madhya Pradesh, Uttar Pradesh, Punjab, Rajasthan, Gujarat, Maharashtra, Tamil Nadu (Ramakrishna, 1995)	57. *Porcellio laevis* (Latreille, 1804)
Assam, Meghalaya, West Bengal, Orissa, Madhya Pradesh, Himachal Pradesh, Haryana, Punjab, Rajasthan, Maharashtra, Karnataka, Tamil Nadu (Ramakrishna, 1995)	58. *Porcellio scaber* (Latreille, 1804)
Orissa, Bihar: Chhota Nagpur, Madhya Pradesh, Tamil Nadu, Maharashtra, Rajasthan, Haryana, Himachal Pradesh (Ramakrishna, 1995)	59. *Porcellio spinicornis* (Say, 1818)
Porcellionides Miers, 1877	
West Bengal: Kurseong (Collinge, 1914, Stebbing, 1911); Assam: Sadyia (Collinge 1914); Arunachal Pradesh: Kobo, Rotung (Collinge, 1914), Kemangdivison (Ramakrishna, 1965); Assam, Meghalaya, Bihar, West Bengal, Madhya Pradesh, Uttar Pradesh, Himachal Pradesh, Haryana, Punjab, Rajasthan, Andaman & Nicobar island, Lakshadweep island (Ramakrishna, 1995);	60. *Porcellionides pruinosus* (Brandt, 1833)
Family SCLEROPACTIDAE Verhoeff, 1938	
***Adinda* Budde-Lund, 1904**	
Kerala: Palni hills, tandikdi, meryland shola (Ferrara, Meli & Taiti, 1995)	61. *Adinda carli* (Ferrara, Meli & Taiti, 1995)
Kerala: Ponmudi, Travancore (Collinge, 1915)	62. *Adinda gigas* (Collinge, 1915)
Tamil Nadu: Annamalai hills,Valparai, Naduar estate (Ferrara, Meli & Taiti, 1995)	63. *Adinda lobata* (Ferrara, Meli & Taiti, 1995)
Kerala: Nilgiri hills (Ferrara, Meli & Taiti, 1995)	64. *Adinda nilgiriensis* (Ferrara, Meli & Taiti, 1995)
Kerala: Palni hills (Ferrara, Meli& Taiti, 1995)	65. *Adinda palniensis* (Ferrara, Meli & Taiti, 1995)
Tamil Nadu: Anamalai hill, Madras (Collinge, 1915); Kerala: Cochin (Collinge, 1916, Ramakrishna, 1993);	66. *Adinda stebbingi* (Collinge, 1914)
Kerala: Maddathoray, Travancore (Ramakrishna, 1993)	67. *Adinda travancorensis* (Stebbing, 1911)
Tamil Nadu: Annamalai hills, Attakatti shola, (Ferrara, Meli & Taiti, 1995)	68. *Adinda triangulifera* (Ferrara, Meli & Taiti, 1995)
Family TRACHELIPODIDAE Strouhal, 1953	
Nagurus Holthuis, 1949	
Andaman Islands (Ferrara & Taiti, 1982).	69. *Nagurus acutitelson* (Ferrara and Taiti, 1982)
Orissa: Chilka Lake, Rambha dist. (Ramakrishna, 1995)	70. *Nagurus carinatus* (Dollfus, 1905)

Table 1. *Continued ...*

Distribution	Name of the species
Tamil Nadu: Madras (Verhoeff, 1936)	71. *Nagurus clavigerus* (Verhoeff, 1936)
Andaman Islands (Ferrara & Taiti, 1982)	72. *Nagurus havelocki* (Ferrara & Taiti, 1982)
Kerala: Kovalam (Verhoeff, 1936)	73. *Nagurus travancorius* (Verhoeff, 1936)
***Trachelipus* Budde-Lund, 1908**	
Assam, Meghalaya, Arunachal Pradesh, Bihar, West Bengal, Orissa, Madhya Pradesh, Uttar Pradesh, Rajasthan, Haryana, Himachal Pradesh, Punjab, Maharashtra and Karnataka, Tamil Nadu, Andhra Pradesh (Ramakrishna, 1995)	74. *Trachelipus rathkii* (Brandt, 1833)
Himachal Pradesh, Haryana, West Bengal (Ramakrishna, 1995)	75. *Trachelipus ratzeburgii* (Brandt, 1833)
Family: TYLIDAE Dana, 1852	
***Tylos* Audouin, 1826**	
Nicober Island (Budde-Lund, 1885)	76. *Tylos albidus* (Budde-Lund, 1885)
Suborder PHREATOICIDEA	
Family HYPSIMETOPIDAAE Nicholls, 1943	
***Nichollsia* (Chopra & Tiwari, 1950)**	
Uttar Pradesh: Benaras (Chopra & Tiwari, 1950)	77. *Nichollsia kashiense* (Chopra & Tiwari, 1950)
Bihar: Monghyr (Tiwari, 1955)	78. *Nichollsia menoni* (Tiwari, 1958)

trial isopods have been reported till date. Report also shows that in many states, still no work has been initiated for this particular group. Chandigarh, Chattisgarh, Dadra & Nagar Haveli, Daman & Diu, Delhi, Mizoram, Nagaland, Puducherry, Sikkim, Telengana, Tripura and Uttarakhand have no report of occurrence of any species of terrestrial isopod. So, an elaborative studyis very much in demand for these animals.

Table 2. State wise list of all family, genus and species of all terrestrial isopods in India

Species	Genus	Family	Name of States
5	5	4	Andhra Pradesh
17	13	9	Andaman & Nicobar Island
8	7	5	Arunachal Pradesh
6	5	4	Assam
8	6	5	Bihar
4	4	3	Goa
1	1	1	Gujarat
6	4	3	Haryana
6	4	3	Himachal Pradesh
5	2	2	Jammu & Kashmir
1	1	1	Jharkhand
7	6	5	Karnataka
18	11	7	Kerala
2	2	2	Lakshadweep
8	5	3	Madhya Pradesh
7	4	4	Maharashtra
2	2	2	Manipur
8	6	4	Meghalaya
16	11	7	Odisha
4	3	2	Punjab
7	4	3	Rajasthan
20	12	7	Tamil Nadu
7	7	5	Uttar Pradesh
10	7	4	West Bengal

Habit and habitat

Terrestrial isopods generally live on the decaying matters on soils, under leaf litters, stone or barks of woods. They mostly prefer to stay in moist places but some group are specialized to stay in almost dried up parts of soils (Armadillidae); some genus *Porcellio* and *Philoscia* are commonly live under the flowering pots, some are adapted in cavernicolous habitat. A very few species found in subterranean habitat.

They usually feed in night, on vegetable matters with algae, fungi, moss, bark, and any type of decaying vegetables, occasionally they feed on animal matters also. There are some species lives that shows commensalism with ants, which feeds on faecal matter of the ants. A few isopods are carnivorous in their feeding habit.

Significance of this group

Terrestrial Isopods are one of the major invertebrate groups that may help in decomposition of leaf litters and by this way they may be considered as the important component of food chain. The leaf litter de-

composition is carried out by the combined action of microorganisms and decomposer invertebrates such as earthworms, diplopods and terrestrial isopods. The role of this animals in nutrient cycle are well studied in abroad (Khalaeid and Walkail, 2015). Some isopods are considered as pests in vegetable gardens and in horticulture. Cotton and lime trees are affected by isopod pests in damaging their barks (Collinge, 1914).

Acknowledgement

One of the authors (S.M) wish to express his deep-felt gratitude and thanks to Dr. Kailash Chandra, Director, Zoological survey of India, for providing facilities to complete this work.

References

Barnard, K. H. 1936. Terrestrial isopods and amphipods from Mauritius. *Annals of the Natal Museum.* 8 : 1-17.

Budde-Lund, G. 1879. *Prospectus generum* specie rumquecrustacerumisopodumterrestrium. 10 pp. Copenhagen.

Budde-Lund, G. 1885. Crustacea Isopoda Terrestria per Familias et Genera et Species descripta. Hauniae: Sumtibus Auctoria. 320 pp.

Chilton, C. 1916. Some Amphipoda and Isopoda from Barrington Tops (4,600 ft. alt.) N.S.W. *Journal and Proceedings of the Royal Society of New South Wales.* 50: 82–98.

Chopra, B. 1924a. Isopoda of Siju Cave, Garo hills, Assam. *Rec. Indian Mus*. 26 (1): 49-60.

Chopra, B. 1924b. On four Myrmecophilous Isopods from Barkuda. *Rec. Indian Mus.* 26(5): 523-528.

Chopra, B. 1947. First record of occurrence in India of the ancient suborder Phreatoicoidea (Crustacea: Isopoda). *Proceedings of the 34th Indian Science Congress.* 3: 176–17.

Chopra, B. and Tiwari, K. K. 1950. On a new genus of phreatoicid isopod from wells in Banaras. *Records of the Indian Museum (Calcutta)*. 47 (3/4) : 277-289.

Collinge, W. E. 1914a. Terrestrial Isopoda. In: vol. 8. Zoological Results of Abor Expedition, 1911-1912. Part 4. *Rec. Indian Mus*. 8(4):465-469.

Collinge, W.E. 1914b. On some new terrestrial isopods from the Andaman Islands and southern India. *Rec. Indian Mus*. 10 : 207-210.

Collinge, W. E. 1914c. Description of a new species of terrestrial isopoda from India. *Annls. Mag. Nat. Hist.* 8 (14) : 206-208.

Collinge, W. E. 1915. Contributions to knowledge of the terrestrial isopoda of India. Part 1. *Rec. Indian Mus.* 11(2) : 465-469.

Collinge, W. E. 1916.Contributions to a knowledge of the terrestrial isopoda of India. Part 2. Some new species of *Paraperiscyphis*, *Cubaris*, etc. *Rec. Indian Mus*. 12(3): 115-128.

David, H. 1967. Philoscia sacchari- a new soil isopod damaging sugarcane buds in Tanjore district (Crustacea: Isopoda). *Journal Zoological Society of India.* 17 : 120-122.

Dev Roy, M. K. 2013. Marine and estuarine isopod fauna (Crustacea: Isopoda) of India. *Journal of Environment and Sociobiology.* 10(2): 147-178.

Ferrara, F. and Taiti, S. 1982. Isopoditerrestridelle Isole Andamane. *Bollettino del Museo Civico di Storia Naturale Verona.* 8 : 459-492.

Ferrara, F., Meli, C. and Taiti, S. 1995. Taxonomic revision of the subfamilyToradjiinae (Crustacea: Oniscidea: Scleropactidae). *Zoological journal of Linnean Society*. 113 : 351-459.

Jackson, H. G. 1935. Isopoda terrestria. In: P. C. Visser, Wissenschaftliche Ergebnisse der Niederlandischen *Expeditionen in den Karakorum.* 1 : 161-168.

Jalaja Kumari, C., Hanumantha Rao, K. and Shyamasundari, K. 1989. A new species of the genus *Euphiloscia* Packard (Crustacea: Isopoda: Oniscoidea) from Waltair coast, India. *J. Bombay nat. Hist. Soc*. 86 (1) : 77-80.

Khaleid F. Abd El-Wakeil, 2015. Effects of terrestrial isopods (Crustacea: Oniscidea) on leaf litter decomposition processes. *The Journal of Basic & Applied Zoology*. 69 : 10-16.

Kwon, D. H., Ferrara, F. and Taiti, S. 1993. Two new species of *Laureola* from India and Vietnam (Crustacea: Oniscidea: Armadillidae). *Revue Suisse de Zoologie.* 99 (3) : 645-653.

Ram, L. and Kumar, B. 1979. A new species of *Cubaris* Brandt. (Crustacea: Isopoda: Armadillidae) from India. *Bull. Zool. Surv. India.* 2 (1) : 43-47.

Ramkrishna, G. 1965. Studies on the Indian Isopods. Part II. Notes on the Oniscid collection from the Kameng Division, NEFA. *Rec. zool. Surv. India.* 63: 181-184.

Ramkrishna, G. 1969. On a new species of *Philoscia* (Isopoda: Oniscidae) from Lodna Colliery, Bihar. *Bull. Syst. Zool*. 1 (2) : 67-70.

Ramkrishna, G. 1975. Results of fifty years of faunistic survey of Indian Isopods. *Rec. zool. Surv. India.* 68 (1-4) : 297-303.

Ramkrishna, G. and Sinha, B. 1993. Systematic status of the genera *Adinda, Periscyphis, Paraperiscyphis* and *Toradjia* (Crustacea: Isopoda: Oniscoidea: Armadillidae). *Rec. Zool. Surv. India*. 93 : 491-505.

Stebbing, T.R.R. 1908. A note on the Isopod genus *Tachaea*. *Rec. Indian Mus*. 2 : 107.

Stebbing, T. R. R. 1911. Indian Isopods *Rec. Indian Mus*. 6 (4) : 179-191, pls. 10-12.

Tiwari, K. K. 1955. Nichollsidae, a new family of Phreatoicoidea (Crustacea: Isopoda). *Rec. Indian*

Mus. 53 (3 & 4) : 293-296.
Tiwari, K. K. 1955. Another new species of *Nichollsia* (Crustacea: Isopoda: Phreatoicoidea). *Rec. Indian Mus.* 53 (3 & 4): 379-381.
Verhoeff, K.W. 1928. *Isopodenaus formosa*. Mitteilungenaus dem *Zoologischen Museum in Berlin.* 14 : 200–226.
Verhoeff, K.W. 1928. Übereinige Isopoden der Zoologishchen Staatsammlung in München. 38. Isopoden-Aufsatz. *Zoologischer Anzeiger.* 76 : 113–123.
Verhoeff, K. W. 1936a. Uebereinen Land-Isopodenaus Ladak. *Mem. Conn. Acad. Arts Sci.* 10 : 187-190.
Verhoeff, K. W. 1936b. Uebereinige Isopoda aus Sud-Indian. *Rec. Indian Mus.* 38 : 97-102.
Verhoeff, K. W. 1936C. Uebereinige Myriapoden und Isopodenaus Dekangesammelt von Herrn S. J, Madras. *Rec. Indian Mus.* 38 : 503-512, pls. 15-16.