

New Records of Soil Galumnid Mites (Acarina: Cryptostigmata) From Dampa Tiger Reserve, Mizoram, India

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Abstract

Among all the soil micro-arthropods, mites are predominant and playing important role in increasing soil fertility through organic decomposition and they are inhabiting in all types of soil but predominantly found in soil litter, humus, and compost heaps. The present research work has been done to identify and prepare a record of the soil Galumnid mites from this region as very few works has been done on the taxonomy of this important group in this geographical area as well as in India. Only one major work has been found which was published by Sanyal (2009)^[1] on the study of oribatid mites of Mizoram. Amongst all the States of India, Mizoram has the highest area under forest cover in terms of percentage of geographical area. Dampa Tiger Reserve of western Mizoram of India is located at Indo-Myanmar hotspot in the Lushai hills is one of the remotest Tiger Reserve of the country and immensely rich in floral and faunal biodiversity. 9 species including 5 genera of Galumnid mites are newly recorded for the first time from this area of study.

Keywords: Soil Galumnid mites , Dampa Tiger Reserve, Taxonomy.

1. Introduction

The Galumnid mites are under the suborder 'Oribatida' or 'Cryptostigmata' of the order 'Acarina'. Oribatid mites are tiny, predominating group of all the inhabitants of soil mites. These mites are commonly called as "beetle" or 'moss' mites. Oribatid mites show many variations in structure, colour and habitat but most of them have a hard exoskeleton. Like all mites, these animals are close relatives to ticks and spiders. Oribatid mites live in huge numbers in soil. Hundreds of thousands of mites can live in one square meter of soil. Soil mites only can constitute about 80% of soil fauna (van der Drift, 1951)^[2] but most of them are concentrated in upper 0-20 cm. It is also observed that a small fraction of the energy flow of decomposition passes through oribatids. This energy flow is again used by means of quantifying ecosystem. These mites cause injurious effects to plants through inoculation of the fungal spores (Senbusch, 1954)^[3]. Some oribatids act as intermediate host of certain tapeworms like anoplocephaline cestodes of cattle and of other domestic animals. Very few oribatids are also used as biological control agents. Owing to their importance and significance in soil zoology, veterinary, parasitology and agriculture.

In the North Eastern part of India, Mizoram covers geographical area of 21,081 sq km, which is 0.64% of the geographical area of the country. The State lies between 21°56'N to 24°31'N latitude and 92°16'E to 93°26'E longitude and shares borders with Tripura in the west, Assam and Manipur in the north. Mizoram also shares international border with Myanmar on the east and Bangladesh in the south and west.

Geographically, the State is comprised of rugged, steep hill ranges and interspersed valleys. The State has a climate ranging from moist tropical to moist sub-tropical. The annual rainfall ranges between 2,100 mm to 3,500 mm and the annual temperature during winter, 11°C to 24°C and in summer between 18°C to 29°C. It rains heavily from May to September. The state of Mizoram is a part of the Indo-Burma Global Biodiversity Hotspot

Oribatid fauna of Mizoram has been very little explored by only one major work published by Sanyal (2009) in the state fauna series 14, the fauna of Mizoram, part-2. Total 40 species were recorded under 29 genera and 22 families during that survey. All the species were reported for the first time from the State of Mizoram and the specimen were preserved in the National Zoological Collection, Zoological Survey of India. Oppiidae, Scheloribatidae and Galumnidae were found dominant among the other families of oribatid mites in the State of Mizoram. 9.5% of Indian oribatid fauna are known from the State of Mizoram during that study.

In this context the taxonomy and ecology of this group of mites is worth studying.

2. Aim and Objective:

The "characteristically shaped galumnid mites possess a pair of wing like 'pteromorphae' at the both sides of notogaster and most of them are heavily sclerotized and highly pigmented. They inhabit in all types of soil but predominantly found in soil and litter with rich organic matter. Under the family Galumnidae a total of 34 genera are known from the world of which 13 galumnid genera have been reported from India till date (Sarkar et al., 2012)^[4]. The present research work has been done to identify and prepare a record of the soil Galumnid mites from this region as very few works has been done on the taxonomy of this important group in this geographical area as well as in India.

3. Material and Method:

For taxonomic studies of galumnid mites, samples mainly litter, soil and humus were collected from various sampling sites near the Headquarter located at West Phaileng of Dampa Tiger Reserve during the period of September, 2023 to April, 2024. The samples were taken from the upper 10m of soil profile and brought to the laboratory in polythene bags. Then the modified Tullgren funnel extraction apparatus was used to extract the mites from such soil. The extracted mites were collected in glass vial containing 70%-90% ethyl alcohol. The galumnid mite specimens were sorted out from rest of their associated fauna. Then the specimens were made ready for the taxonomic study following the usual procedure of keeping the mites in a vial containing an equal amount of 90% ethyl alcohol and lactic acid for maceration because most of the galumnid mites are heavily sclerotized. This method was suggested by J. Balogh (1965, 1972)^{[5][6]} and Balogh and Mahunka (1983)^[7]. For microscopic observations the temporary mounting method suggested by Balogh and Mahunka (1983) were followed. The almost transparent specimen was placed on a slide containing a small amount of lactic acid as mounting medium, and necessary microscopic observations were done. All the measurements were taken with the help of ocular and stage micrometer. The measurements were taken in micron.

4. Observation and Result:

The new records of the galumnid mites studied from this area are listed below.

1. *Pergalumna longiporosa* Fujita and Fujikawa, 1987^[8].

Material examined: Single female, India: Mizoram: Mamit. West Phaileng , 27.04.2024 from soil litter,

coll: S.Sarkar.

Distribution: INDIA: Andaman, Mizoram, Elsewhere: Japan.

2. *Pergalumna andicola* Hammer, 1961 ^[9].

Material examined: 2 adult females, India: Mizoram: Mamit. West Phaileng, 26.12.2023 from soil litter, coll: S.Sarkar.

Distribution: INDIA: Jharkhand: Ranchi; West Bengal: Purulia, Howrah, Mizoram: Mamit, Elsewhere: Peru.

3. *Pergalumna granulates* Balogh and Mahunka, 1967 ^[10].

Material examined: Single adult female, India: Mamit. Dampa Tiger Reserve: 4.11. 2023 from soil litter, coll: S.Sarkar.

Distribution: INDIA: West Bengal, Uttarakhand, Mizoram ; Elsewhere: Vietnam

4. *Pergalumna hastata* Aoki, 1987 ^[11].

Material examined: Single female, India: Mizoram: Mamit. West Phaileng, 27.04.2024, from soil litter, coll: S.Sarkar.

Distribution: INDIA: Mizoram, West Bengal

Elsewhere: Japan: Northern Yoron Island.

5. *Leptogalumna ciliata* Balogh, 1960 ^[12].

Material examined: 2 adult female, India: Mizoram: Mamit. West Phaileng , 27.04.2024, from soil litter, coll: S.Sarkar.

Distribution INDIA: West Bengal Howrah, 24 Pgs. Uttar Pradesh, Chhattisgarh, Mizoram.

Elsewhere: Angola, Tahiti, Cuba. Madagascar, China.

6. *Galumna (Galumna) parascaber* Deb and Raychoudhuri, 1975^[13].

Material examined. 3 adult females, India: Mizoram: Mamit. West Phaileng , 27.04.2024 from soil litter, coll: S Sarkar.

Distribution: INDIA: West Bengal, Uttar Pradesh, Mizoram

7. *Trichogalumna (Trichogalumna) vietnamica* Mahunka, 1987 ^[14] .

Material examined: Single female, India: Mamit. Dampa Tiger Reserve: 4.11. 2023, 27.09.2023 from soil litter, coll: S Sarkar.

Distribution: INDIA: Uttarakhand, Mizoram, Elsewhere: Vietnam.

8. *Galumna (Galumna) flabellifera orientalis* Aoki, 1965 ^[15] .

Material examined. 3 adult females, India: Mizoram: Mamit. West Phaileng , 27.04.2024 from soil litter, coll: S Sarkar.

Distribution: INDIA: West Bengal, Tripura, Uttarakhand, Karnataka, Lakshadweep, Mizoram. Elsewhere: Thailand

9. *Acrogalumna longipluma* Berlese, 1904 ^[16] .

Single adult female, India: Mamit. Dampa Tiger Reserve: 4.11. 2023 from soil litter, coll: S.Sarkar.

Distribution: INDIA: Kerala, West Bengal, Uttar Pradesh, Mizoram

Elsewhere: South Africa, New Zealand, Santa Helena

5. Conclusion:

In this project work, a preliminary study on the soil microfaunal composition emphasizing on soil oribatid mites of the Dampa Tiger Reserve in Mizoram of India were made. The study provides interesting findings and valuable information about the micro fauna of the forest patches and their significance in ecological

importance and biodiversity. The higher mite population in the soil indicate the species richness in soil. Very little research work has been done so far in this field so there is a lot of scope for further research of mites in this forest area. The new records of galumnid mites will enrich the taxonomy of Indian acarological research. 9 species including 5 genera of Galumnid mites are newly recorded for the first time from this area of study

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