



Study of Diversity of Millipede Fauna (Arthropod:Diplopod) in Achalpur Region (M.S.) India

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ABSTRACT

Biodiversity refers to the variety and variability of life on earth. Millipedes are group of arthropods. There are known scientifically as the class Diplopoda. Diplopods are some of the most frequent fauna of Tropical, Subtropical, Temperate forest floors and other ecosystems. The Indian diplopod fauna known today, consists of 11 orders, 20 families and about 100-120 genera with around 500 species. Diplopods are commonly called millipedes, meaning 'thousand legs', although no individual of this group bears a thousand legs, their many legs and wave-like motion has given them the name millipede. The Extensive study was conducted in between July to October. Site Identification were done Most species of millipedes commonly found in dark moist areas near water, Moist places beside the road. Forest roads are excellent areas for millipede collection, Millipedes sample are collected unusually in zip-lock transparent plastic bags. Collected millipedes is preserved into 70% alcohol and then identified. Total five species of 2 different order were collected from the study area are as follows: *Anoplodesmus tanjoricus*, *Mordonius importatus*, *Chondromorpha mammifera*, *Trigoniulus corallines*, *Phyllogonostreptus amballae*. During the present study, Millipede(diplopods) were collected from various places in Achalpur region.

Keywords : Biodiversity, Diplopod , Millipede Fauna, Achalpur

1. INTRODUCTION

The present work was carried out to study the distribution of millipede diversity in Achalpur region in district Amravati. This study was tried to explore the diversity of millipede in Achalpur region. (Hoffman/1979) reported Diplopoda of the world, comprising 10,000 species under 15 orders, 115 families and over 1,700 genera. Studies on Indian diplopod date back to the pre-independence era, and since then have not been updated. (Attems C1936) reported

290 species from Indian Territory. The millipede were belong to phylum Arthropoda and class diplopods. This milliped founa are classified into 16 order and 145 families (Shelley R.M. 2007, Sierwald p.2001)

Diplopods are commonly called millipedes, meaning 'thousand legs', although no individual of this group bears a thousand legs, their many legs and wave-like motion has given them the name millipede. Diplopods are defined as many-segmented, many-legged, terrestrial, tracheate, mandibulate, antennate, progoneate, oviparous and anamorphic arthropods. Body measures from 2.0 mm (Polyxenida) to 200 mm in length (Spirostreptida, Spirobolida and Julida). S. V. Deshmukh and C. K. Deshmukh (2011). The millipede species are found under logs and stones in moist soil under leaf litter. These millipedes inhabit the cool, moist localities under the shrubs, bushes, woods and plants. They are herbivorous animals.

They usually avoid light, attracted to dark, cool, moist environment, usually going unnoticed in the summer due to their nocturnal habits and tendency to disperse. They feed on living and decomposing vegetation and occasionally on dead snails, earthworm and insects. They can occur on soft stemmed plants in garden and greenhouses. They cannot tolerate water saturated soils, which forces them to the surface and higher ground. Likewise, dry drought condition can stimulate migration. Millipedes is highly diverse group of terrestrial organisms with over 12,000 described species and an estimated 80,000 species yet to be described. Among soil Arthropods, millipedes act as primary destructors of plant debris and play a crucial role in soil formation processes. Many millipedes can also serve as indicators of environmental conditions and improve the structure content of organic matter and nutrient elements of soil. (brunner H 2001). The millipede mostly found in rainy season and rarely found in summer season so that they are seasonal arthropods and fluctuation in temperature are affect on millipede fauna. (Ashwini KM, Shridhar KR ,2006)

2. MATERIALS AND METHODS

Achalpur city is located in Amravati district of Maharashtra and closely connected with melghat region. It has $21^{\circ} 15' 26''$ Latitude and $77^{\circ} 30' 31''$ Longitude. Achalpur city is located in the lap of satpuda range of hills in central India so that it is rich in biodiversity. Sapan and Bicchan are the main river in this area and having veriety of crop like orange, Cotton, sorghum, oilseeds, wheet and pulses.

2.1 Study Area: Extensive study was conducted in MONsoon seasons between July 2021 to October 2021. We selected some 7 different farms in Achalpur region and observe the occurrence of different species of millipeds. Most species of millipedes commonly found in dark moist areas near water. Moist places beside the road. Forest roads and farms are excellent areas for millipede collection.

2.2 Sample Collection: Millipede samples are collected for photography by hand picking method. Samples can be taken from rotten woods, under stone, uppermost soil strata and all kind of plant debris. The photographs were taken to collected species and then release them in their natural habitat. species is identified by using field guider and standard literature.

3. RESULTS AND DISCUSSION

In comparison with above results in present investigation 14 species of millipedes were collected from different habitats and localities of Achalpur region. In present study 5 species of Millipede were recorded in the study area. In present study the species belongs to 5 genera were recorded. In that 3 species are already recorded in 2014 (C. R. Choudhari, Y.K. Dumbare and S.V. Theurkar 2014). The Achalpur region harbours the eight species of millipede which are of two orders (Polydesmida and Spirostreptida). Spirostreptida is the largest order of millipede 4 species belongs to order Spirostreptida included *Mordonius importatus* (Demange, 1977), *Phyllogonostreptus amballae* (Chamberlin, 1923), *Phyllogonostreptus amballae* (Chamberlin, 1923) *Narceus americanus* (Palisot de Beauvois, 1817) and 4 species belongs to order Polydesmida included *Anoplodesmus tanjoricus* (Pocock, 1892), *Chondromorpha mammifera* (Attems, 1936). *Orthomorpha coarctata* (de Saussure, 1860) *Harpaphe haydeniana* (Wood, 1864)

Table 1: showing the distribution of Millipede species

Sr.No.	Order	family	Genus	Species
1.	Polydesmida	Paradoxosomatidae	Anoplodesmus	<i>Tanjoricus</i>
2.	Polydesmida	Paradoxosomatidae	Chondromorpha	<i>mammifera</i>
3.	Polydesmida	Paradoxosomatidae	Orthomorpha	<i>coarctata</i>
4.	Polydesmida	Xystodesmidae	Harpaphe	<i>haydeniana</i>
5.	Spirostreptida	Spirostreptidae	Mordonius	<i>Importatus</i>
6.	spirobolida	Trigoniulidae	Trigoniulus	<i>T.corallinus</i>
7.	Spirostreptida	Harpagophoridae	Phyllogonostreptus	<i>amballae</i>
8.	spirobolida	Spirobolidae	Narceus	<i>americanus</i>

The following species under two orders of millipede were identified from the study area.

I) Order – Polydesmida

It is one of the largest order of millipede fauna. This order include flat backed millipede with fused sclerites. Under these order we recorded 4 species in the given area.

1) *Anoplodesmus tanjoricus*- (Pocock, 1892)

It is commonly known as yellow-spotted millipede or almond-scented millipede. It is in order Polydesmida belongs to family Paradoxosomatidae. This millipede species is found everywhere in the field of green grants, gardens, open ground covered with grass, various parts of Achalpur region. These are coisotropic millipede found abundantly on the surface of earth during rainy season.

2) Chondromorpha mammifera (Attems, 1936),

It belongs to order Polydesmida and family Paradoxosomatidae and genus *Chondromorpha*. It is found in field and particularly in the campus of Jagdamba College Achalpur. These millipedes inhabit cool, moist localities, agriculture fields, where there is plenty of organic matter.

3) Orthomorpha coarctata (de Saussure, 1860)

It belongs to order Polydesmida and family Paradoxosomatidae and genus *Orthomorpha*. This species having 22 mm in length, male are 14.5 to 20.5mm and female are 17- 2.5 mm in length. The middle body is segmented with longer gonopods.

4) Harpappe haydeniana (wood, 1864)

It is commonly known as yellow spotted millipede. It belongs to order Polydesmida and family Xystodesmidae. These species is mostly black in colour having yellow patches on both side. It is up to 4-5 cm in length having 0.1 to 0.3 cm width and 0.8 to 1.5 gm weight. it consists of approximately 15-20 segment, it having pair of legs approximately 30 in male and 31 in female.

II) Order – Spirostreptida

This order include spirobolids are generally tropical species consist of pair of leg on the seventh segment of the male are modified into gonopods. From the given order we recorded 4 species.

5) Mordonius importatus (Demange, 1977),

The second millipede species under present investigation is found infield of green grant, gardens, open ground covered with grass, specially cotton field farms in Achalpur. These are herbivorous millipedes and are found in abundance from August to October

6) Trioniulus corallines (Gervais,1847)

Trioniulus, sometimes called the rusty millipede. It belongs to order spirobolida and family *Trioniulidae*. These millipede are medium to large in size, brick red in colour and mostly found in garden and found in bunch, It is also found in South Asia and the Caribbean as an introduced species. These *Trioniulus* inhabit moist areas, rotten wood and compost. It grows upto 5 cm in length and found in bunch. The species *Trioniulus* found everywhere in the field of green grants, gardens, open ground covered with grass, various parts of Amravati district.

7) Phyllogonostreptus amballae (Chamberlin, 1923)

The millipede species in found in the forest area of Amravati district. It belongs to order Spirostreptida and family Harpagophoridae. This is mostly found over a wide area of dense shady and undisturbed gardens. These are herbivorous millipedes and are found in abundance during the months of August to October

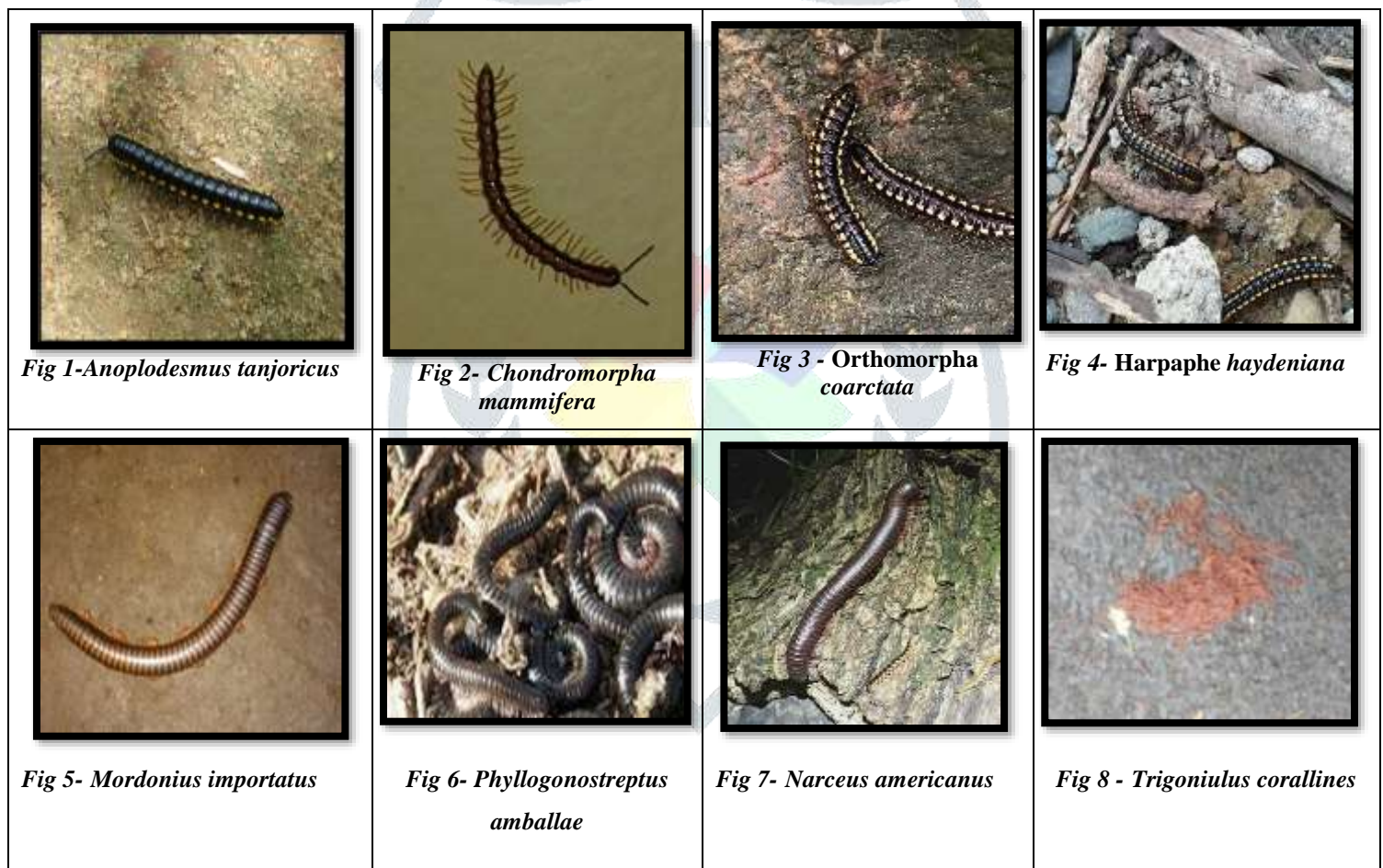
8) Narceus americanus (Palisot de Beauvois,1817)

It is commonly known as American giant millipede. It belongs to order spirobolida and family Spirobolidae. it was found in maize and wheat farm near the river in Achalpur region. Body is cylindrical and blackish brown in colour having 3 inches in length.

During the study it is observed that *Anoplodesmus tanjoricus*, *Orthomorpha coarctata* and *Harpappe haydeniana* species were abundant in nature. The millipede species were active at early morning in few months of rainy season;

it means wet landscape. (S.S.Patil, SB Patil et.al , 2018) . The millipede are good decomposer. (Aldgasam and Ramanathan, 2013) *Trigoniulus corallines* found in dry area by forming colonies . it is capable for composting waste. In recent studies milicompost obtained from this species agriculture residue has physiochemical characteristics similar to vermicompost. (Antunes et al.,2016) *Narceus americanus* was recorded in maize farm near the achalpur city because of geographical location and habitat differences. *Harpaphe haydeniana* is generally found in agricultural area, breaking down leaf litter and freeing its nutrients for other organisms. (Mohammad Misbahul Ahsan et.al 2022) The result reveals that the small number of millipede richness was reported and in the latest account for the ecosystem of Amravati region is a serious underestimation.

Photo 1: showing the photo of all five millipede species recorded



4. CONCLUSIONS

Achalpur city is closely connected with melghat region which is a part of the Satpuda Range of hills which is most diversified area. Most of the millipede species are abundant during rainy season. Total eight species of millipedes were collected from the study area are as follows: *Anoplodesmus tanjoricus*, *Chondromorpha mammifera* , *Orthomorpha coarctata*, *Harpaphe haydeniana* *Mordonius importatus*, *Phyllogonostreptus amballae*, *Trigoniulus corallines*, , *Narceus americanus* During the present study, Arthropods- Millipede (Diplopods) were collected from various places in Achalpur region. present study indicate that there is the necessity of further research on the diversity

of millipede in Maharashtra region and it is also concluded that the effect of seasonal fluctuation on diversity of milliped. Millipede need to conserve from the given area and increase their species richness.

5. REFERENCES

- Alagesab P. Ramanathan B.** Diversity of millipedes in algar hills Reserve forest in Tamil Nadu, India International Journal of Biodiversity,2013, 1-5 ID 715460
- Antunes, L.F.S., Scoriza, R.N., Silva, D.G., and Correia, M.E.F., (2016).** Production and efficiency of organic compost generated by millipede activity. Ciênciã Rural, 46, 815-819
- Ashwini KM, Shridhar KR. (2006)** Distribution of pill millipedes (*Arthrosphaera magna*) and associated soil fauna in the Western Ghats and west coast of India. Pedosphere 2008; 18:133-167.
- C. R. Choudhari, Y.K. Dumbare and S.V. Theurkar (2014).** “Diversity of millipedes along the Northern Western Ghats, Rajgurunagar (MS), India (Arthropod: Diplopod)”. Journal of Entomology and Zoology Studies 2014; 2 (4): 254-257
- Gervais p. (1847)**– Histoire naturelle des insectes apteres, myriapodes, in walckenaer C.A. & gravis P. Histoire naturelle des insects apteres. Tome quatrieme. Librairie encyclopedique de roret, pari:1-333.
- Mohammad Misbahul Ahsan, S.R. Kondulkar et.al (2022)** diversity of millipedes (arthropoda : diplopoda) in selected agricultural landscapes of Achalpur city, district Amravati, Maharashtra, India Int. J. Zool. Appl. Biosci., (7)1 : 23-26
- Shelley RM. (2007)** Taxonomy of extant Diplopoda (Millipedes) in the modern era: perspectives for future advancements and observations on the global diplopod community (Arthropoda:Diplopoda). Zootaxa 2007; 1668:343-362.
- Sierwald P, Bond JE. (2007)** Current status of the myriapod class diplopoda (millipedes): taxonomic diversity and phylogeny. Ann Review of Ento 2007; 52: 401-420.
- S. K. Zilpe (2006).** “Some Neuroendocrinological Aspects Of Millipede Species Of Amravati”. Ph.D. Thesis, University of Amravati, Amravati (India).
- S.S.Patil, SB Patil et.al (2018)** Study of diversity of millipede (Arthropod: Diplopod) At in Around the Northern &Western ghats of Rajgirunagar, (M.S.) India IJRST185206. 2018[(5)2:35-38]
- S. V. Deshmukh And C. K. Deshmukh (2011).** “Histological Studies On The Alimentary Canal Of The Millipede, Anoplodesmus Tanjoricus (Pocock), (Diplopoda: Polydesmida)”. An International Journal of Life Science 6(4): 579 582, 2011.