

Diversity and Richness of Soil Oribatid Mites (Acarina: Arachnida: Arthropoda) in Grape Orchards, Nashik, Maharashtra

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Abstract: *Oribatid are the most commonly found mites and numerically dominant group of Acarinechelicerates and are economically important as they play a vital role in promoting soil fertility through humification of organic matter. Nashik is a city in western India in the state of Maharashtra. It is the third largest district in Maharashtra after Ahmednagar and Pune and is the highest producer of grapes in India. The authors, through a departmental survey programme, have studied the diversity of soil oribatid mites in the grape orchards of Nashik and nearby places and recorded 16 species under 13 genera. The information on oribatid mites of Maharashtra is very poor, since the extant literature contains the record of only 17 oribatid species belonging to 9 genera and 14 families against 2186 species belonging to 643 genera in 207 families reported from India. As there is no such work has been done on soil oribatid fauna from Maharashtra the above species are all new records from this state.*

Keywords: *Soil oribatid, grape orchard, diversity.*

1. INTRODUCTION

This paper deals with the collection of the soil and litter dwelling oribatid mites in different grape orchards in Nashik made by the staffs of Zoological Survey of India in their Maharashtra Survey Programme. Oribatid mites are commonly called as “moss” or “beetle mites”. Oribatids live in all possible habitats including soil, litter, compost, heaps mosses lichens, leaf, bark of trees, bird nest etc. A significant feature of biological activity in soil is the conversion of dead organic matter in inorganic nutrients. The organic content of the soil of some places of Maharashtra is very low and they have very poor fertility. The mites contribute to the regulation of decomposition and nutrient cycling by preying the decomposer worms and arthropods [1]. Apart from that they are useful indicators of heavy metal pollution event as they quickly accumulate and retain heavy metals [2]. Considering the above facts, the primary objective of this study is to scientifically explore, create inventory and document the soil oribatid mite fauna in different areas/ecosystems of Maharashtra. Since there is very little literature on the Oribatid fauna of Maharashtra [3, 4, 5], this study would work out the unrecorded fauna, study of the diversity of fauna besides exploring the possibility of future research.

Situated on the banks of the river Godavari, Nashik is one of the districts of Maharashtra with a hot tropical agro-climatic zone and a highest producer of grapes in India. From the agro-economic point of view, the soil of these grape orchards has never been explored earlier for soil mites. Thus, the present survey was carried out to access the faunal composition of oribatid mites, their species abundance (Fig.1) and diversity (Table 2) in the soil condition of grape vines in Nashik and nearby places.

2. MATERIAL AND METHODS

For taxonomic studies of oribatid mites, litter, soil and humus samples from all possible sites of the grape orchards were collected. The samples collected by shovel from upper 10 cm soil profile were kept in polythene bags. The samples were extracted by using modified Tullgren funnels and extracted mite specimens were collected in glass tubes containing 70% alcohol.

The body of most of the oribatid mite is heavily sclerotized and opaque. The extracted materials were made ready for taxonomic study following the usual procedure of keeping the specimen in solution of 90% alcohol and lactic acid (v/v) as advocated by [6]. For microscopic observations, method of temporary mounting in lactic acid was followed [6]. After necessary microscopic observations the specimen was transferred in small glass vials containing 90% alcohol. The vials were then properly labelled and stored.

The specimens were studied under Nikon Eclipse, 50i microscope. The measurements of the specimens have been given in micron (μm). The specimens were identified using keys prepared by mite taxonomists [7, 8, 9, 10, 11].

All the studied specimens are deposited under National Zoological Collection of Zoological Survey of India, Hqs, Kolkata.

3. RESULTS AND DISCUSSION

Total 16 species under 13 genera of oribatid mites were recorded in this study Table 1. The information on oribatid mites of Maharashtra is very poor, since the extant literature contains the record of only 17 oribatid species belonging to 9 genera and 14 families [3, 4, 5] against 2186 species belonging to 643 genera and 207 families reported from India [10]. Out of the recorded oribatid mites in grape orchards in Maharashtra 7 species, viz. *Amerioppia* sp., *Lasiobelbaremota* Aoki, *Peloribates longisetosus* (Willman), *Plesiodamaeus glaber* Mihelčič, *Scheloribates albialatus* Hammer, *Scheloribates giganteus* Hammer, *Unguizetes clavatus* Aoki were recorded very recently by the authors [5]. Additional 9 species, viz. *Galumna* sp., *Lamellobates palustris* Hammer, *Multioppiastellifera* Hammer, *Oppiakuehnelti* Csiszar, *Protoribates magnus* (Aoki), *Trachyoribates* (*Rostrozetes*) *ovulum* Berlese, *Scheloribates curvialatus* Hammer, *Scheloribates huancyaensis* Hammer, *Tectocephus velatus* (Michael) are hereby recorded for the first time from Maharashtra.

Table 1. Systematic Account of the oribatid mites recorded from grape orchard of Maharashtra.

Family: GYMNODAMAEIDAE Grandjean, 1954
1. <i>Gymnodamaeus glaber</i> (Mihelčič, 1957)
Family: TECTOCEPHEIDAE Grandjean, 1954
2. <i>Tectocephus velatus</i> (Michael, 1880)
Family: OPPIIDAE Grandjean, 1951
3. <i>Amerioppia</i> sp.
4. <i>Lasiobelbaremota</i> Aoki, 1959
5. <i>Oppiakuehnelti</i> Csiszar, 1961
6. <i>Multioppiastellifera</i> Hammer, 1961
Family: SCHELORIBATIDAE Grandjean, 1933
7. <i>Scheloribates albialatus</i> Hammer, 1961
8. <i>S. curvialatus</i> Hammer, 1961
9. <i>S. giganteus</i> Hammer, 1961
10. <i>S. huancyaensis</i> Hammer, 1961
Family: HAPLOZETIDAE Grandjean, 1936
11. <i>Protoribates</i> (<i>Protoribates</i>) <i>magnus</i> (Aoki, 1982)
12. <i>Peloribates longisetosus</i> Willman, 1930
13. <i>Trachyoribates</i> (<i>Rostrozetes</i>) <i>ovulum</i> Berlese, 1908

Diversity and Richness of Soil Oribatid Mites (Acarina: Arachnida: Arthropoda) in Grape Orchards, Nashik, Maharashtra

Family: MOCHLOZETIDAE Grandjean, 1960
14. <i>Unguizetes clavatus</i> Aoki, 1967
Family: ORIBATELLIDAE Jacot, 1925
15. <i>Lamellobates palustris</i> Hammer, 1958
Family: GALUMNIDAE Jacot, 1925
16. <i>Galumna</i> sp.

Diversity was estimated in terms of Shannon-Wiener index, which combines richness and abundance into a single measure (Magurran, 1988). Diversity of *Scheloribates curvialatus* (3.27) was highest among the oribatid community and was followed by *Galumna* sp. (2.95) *Protoribates magnus* (2.38), *Scheloribates huancayaensis* (2.29) and *Amerioppia* sp. (2.11). *Unguizetes clavatus* (1.22) was the least diversified species (Table 2).

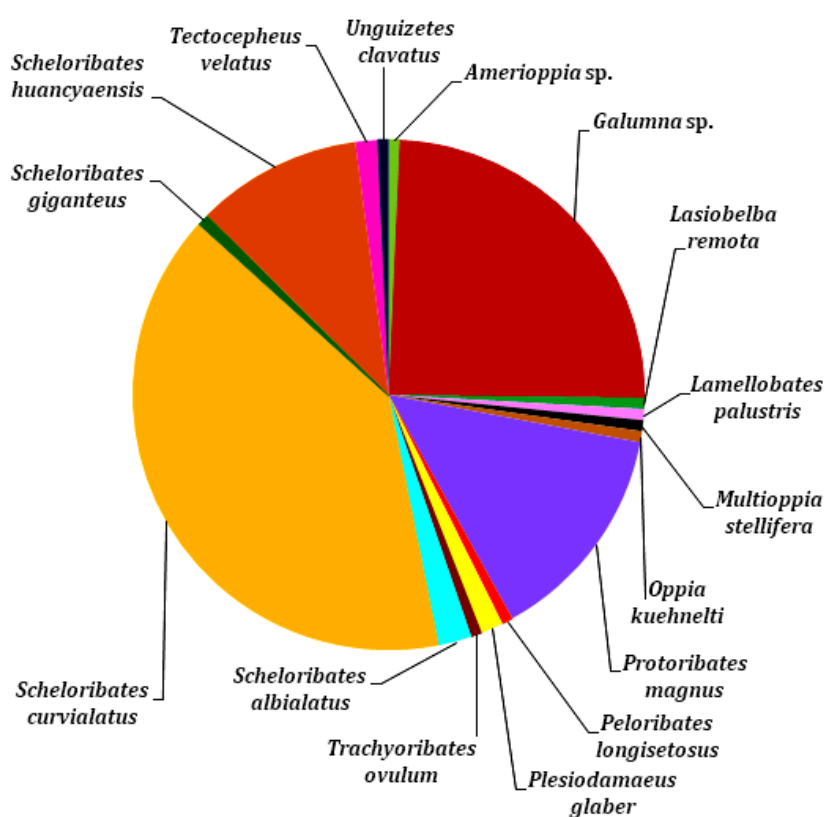


Fig 1. Species diversity of oribatid mites in grape orchards of Nashik, Maharashtra

Table 2. Shannon diversity index of the oribatid mites recorded from grape orchard of Nashik, Maharashtra.

Species	Shannon Diversity Index
<i>Amerioppia</i> sp.	2.11
<i>Galumna</i> sp.	2.95
<i>Lasiobelba remota</i>	1.86
<i>Lamellobates palustris</i>	1.95
<i>Multioppia stellifera</i>	1.64
<i>Oppia kuehnelti</i>	1.59
<i>Protoribates magnus</i>	2.38

<i>Peloribateslongisetosus</i>	1.62
<i>Plesiodamaeusglaber</i>	1.87
<i>Trachyoribatesovulum</i>	1.39
<i>Scheloribatesalbialatus</i>	1.97
<i>Scheloribatescurvialatus</i>	3.27
<i>Scheloribatesgiganteus</i>	1.54
<i>Scheloribateshuancyaensis</i>	2.29
<i>Tectocephusvelatus</i>	1.37
<i>Unguizetesclavatus</i>	1.22

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