

ABSTRACT

The DSc. thesis is with reference to the Oribatida fauna of Vietnam, entitled “**The Oribatida fauna (Acari: Oribatida) of Vietnam - Systematics, zoogeography and zonation, formation and role in the soil ecosystem**”.

The DSc. research work is a synthesis of the author’s studies carried out in Vietnam during the period of 1979 - 2013, and based on the Oribatida materials obtained throughout the country. It aims to study the biodiversity of Oribatida fauna of Vietnam, its systematics, zoogeographical character and zonation, as well as to evaluate initially the role of the Oribatida fauna in the soil ecosystem under main natural and anthropogenic factors.

The tasks of the proposed DSc. thesis are: (1) To make an inventory of the Oribatida species diversity, and to characterize the Oribatida fauna of Vietnam including description of new species; (2) To study the Oribatida systematic structure of Vietnam; and to present a review of the genus *Papillacarus* Kuns 1959 (Lohmanniidae), and a key to nine species, as well as remarks on taxonomic status of *P. arboriseta* Jeleva et Vu, 1987; (3) To analyze the zoogeographical character of the Oribatida fauna of Vietnam, according to the World zoogeographical regions; (4) To analyze the distribution and zoogeographical zonation of the Oribatida fauna, according to natural geographical regions of Vietnam; (5) To introduce the initial description of selected Oribatida species obtained from Vietnam, by giving their morphological images; (6) To investigate initially the formation of the Oribatida community structures in relation to changes of the main natural and anthropogenic factors in Vietnam; and (7) To evaluate primarily the role of the Oribatida communities for soil quality improvement, as bioindicators of climate environmental changes, as well as vectors of tapeworm (Cestoda), in the tropical soil ecosystem of Vietnam.

The important results obtained are as follows:

1. The Oribatida mite fauna (Acari: Oribatida) of Vietnam is recorded with three hundred and twenty (320) species (including 4 subspecies), belonging to 163 genera, 60 families and 2 subfamilies, 28 superfamilies, and 5 suborders. This Oribatida fauna is diverse, representing 3.09% (320 vs. 10,342 species), 13.05% (163 vs. 1,249 genera), and 36.80% (60 vs. 163 families) of the World Oribatida fauna species, genera and families, respectively.

2. One hundred and fifty five (155) Oribatida species, or 48.44% of the Oribatida fauna, were new geographical records for Vietnam. Thirteen (13) new for science species were described, including (1) *Papillacarus arboriseta* Jeleva et Vu, 1987, (2) *Papillacarus benenensis* Vu, Ermilov et Dao, 2010, (3) *Aokiella xuansoni* Vu, Ermilov et Dao, 2010, (4) *Gibbicepheus baccanensis* Jeleva et Vu, 1987, (5) *Leobodes monstruosus* Jeleva et Vu, 1987, (6) *Kokoppia dendricola* (Jeleva et Vu, 1987), (7) *Perxylobates thanhhoaensis* Ermilov, Vu, Trinh et Dao, 2010, (8) *Perxylobates vietnamensis* (Jeleva et Vu, 1987), (9) *Schelorbates cruciseta* Jeleva et Vu, 1987, (10) *Austrachipteria phongnhae* Ermilov et Vu, 2012, (11) *Lamellobates ocularis* Jeleva et Vu, 1987, (12) *Galumna kebangica* Ermilov et Vu, 2012, and (13) *Galumna tenensis* Ermilov, Vu et Nguyen, 2011, are provided.

3. Oribatida systematical structure of Vietnam is diverse in terms of number of superfamilies, families, genera, species and subspecies recorded. However, the number of genera recorded per family, as well as the number of species and subspecies recorded per

genus are not high. Almost of the families consisted of 1 (41.94%), and 2-3 genera, (38.71% of the total 62 families and subfamilies), only one family of Oppidae Grandjean, 1954 consisted of 23 genera; as well as almost of the genera consisted of 1 species (68.10% of the total 163 genera), and two genera consisted of more than 10 species, including *Galumna* Heyden, 1826 and *Pergalumna* Grandjean, 1936, recorded with 13 and 11 species, respectively.

4. A review of the Oribatida mites genus *Papillacarus* Kunst, 1959 (Oribatida: Lohmanniidae), and a key to nine species recorded from Vietnam, namely (1) *P. arboriseta* Jeleva et Vu, 1987, (2) *P. benenensis* Vu, Ermilov et Dao, 2010, (3) *Papillacarus cornutus* (Sarkar et Subias, 1984), (4) *P. hirsutus* (Aoki, 1961), (5) *P. indistinctus* Ermilov, Anichkin et Wu, 2012, (6) *P. polygonatus* Ermilov et Anichkin, 2011, (7) *P. polysetosus* Ermilov, Anichkin et Wu, 2012, (8) *P. ramosus* Balogh, 1961 and (9) *P. undirostratus* Aoki, 1965, are presented. It is proved that, the Oribatida species *P. arboriseta* is clearly differs from *P. hirsutus*.

5. The zoogeographical character of the Vietnamese Oribatida fauna is diverse, consisted of all World eight zoogeographical elements, except only the Antarctic. The World zoogeographical elements participating in the Oribatida fauna of Vietnam are arranged according to following order: (1) Oriental component occupying 60% of the total 320 species, >(2) Palaearctic – 12.5%, >(3) Cosmopolite – 10.9%, >(4) Afrotropical – 6.9%, >(5) Australian – 5.0%, >(6) Neotropical – 3.5%, >(7) Nearctic - 0.9%, and >(8) Pacific – 0.3%.

6. The main zoogeographical character of the Oribatida fauna of Vietnam is the Oriental region. This Oribatida fauna has a high specialty, with 111 species, occupying 34.68% of the total, recorded only from Vietnam, probably endemic species. The Oribatida fauna of Vietnam includes also the Palaearctic, with 40 species recorded, and Cosmopolite - 35 species, occupying 12.5% and 10.9% of the total, respectively.

7. The morphological images of the selected one hundred thirty and three (133) Oribatida species recorded from Vietnam, mostly including pictures of dorsal, ventral and lateral image, and the body measurements, occupying 41.56% of the total number, are provided. They can be used as useful images – identification for the common Oribatida species of Vietnam.

8. According to habitat types, the formation and change of Oribatida community structures is starting to form in the natural forests; then under the agricultural intensification on soil ecosystem, it changes in the human-disturbed habitats, through intermediate community in the grassland and scrubs. It is proposed that, the habitat type of grassland and scrubs can play as a transformational ecosystem for reestablishment of the soil Oribatida mite community. Three Oribatida species (1) *Tectocephus velatus* (Michael, 1880), (2) *Scheloribates praecinctus* (Berlese, 1916) and (3) *Lamellobates ocularis* Jeleva et Vu, 1987, are the most widespread and most persisting species of northern Vietnam, and can be considered as bioindicators of disturbed soil ecosystems.

9. A tendency of formation of two distinct Oribatida communities is revealed according to soil type: (1) the alluvial, and (2) the ferralitic soils. It could be suggested that, soil type plays a major role in formation of the species diversity of the Oribatida mites community.

10. The Oribatida fauna of Vietnam is grouped in three main regions, in Northern, Central and Southern Vietnam. From north to south of the country, the distribution and

zoogeographical zonation of the Oribatida fauna can be divided into six (6) sub-regions, as follows:

(i) Region between (I) Northwest, and (II) Northeast (North Vietnam), with eight characteristic species.

(ii) Region of (IV) Red River Delta (North Vietnam), with five characteristic species

(iii) Region of (V) NP Cat Ba Island of the Red River Delta (North Vietnam), with two characteristic species.

(iv) Region between (III) the Uplands of the Red River Delta, and (VII) NP Phong Nha - Ke Bang of Central North (North Vietnam and Central North Vietnam), with four characteristic species.

(v) Region of (VI) NP Ben En of North Central (North Central Vietnam), with seven characteristic species.

(vi) Region between (VIII) NP Bu Gia Map of Southern - Mekong River Delta:, and (IX) NP Cat Tien of Southern - Mekong River Delta (South Vietnam), with eight characteristic species.

11. Recorded are ten (10) tapeworm species (Cestoda: Anoplocephelidae), parasiting on 21 animal species of Vietnam, using Oribatida mites as an intermediate hosts.

12. In relation to agricultural activities and to climate environment changes, found are a different and clear changes in Oribatida mite community structures, so that they can be used as bioindicators of natural and anthropogenic influencing on soil ecosystem.