International Journal of Entomology Research
www.entomologyjournals.com
ISSN: 2455-4758
Received: 15-06-2026, Accepted: 15-07-2026, Published: 30-07-2026
Volume 11, Issue 3, 2026, Page No. 197-201

Species composition and diversity of Coleopteran fauna in the Sree Krishna College, Ariyannur, Thrissur, Kerala, India

Raji R*, Fida Parvin P
Department of Zoology, Sree Krishna College, Ariyannur, Thrissur, Kerala, India
Corresponding Author: Raji R
DOI: https://doi.org/10.66856/ijer.2026.11.3.11257

Abstract
The present study was conducted to assess the species composition and distribution of coleopteran insects in the Sree Krishna College campus and nearby area from July 2023 to February 2024. Overall, 34 Coleopteran insect species belonging to 34 genera and 15 families have been documented. The Scarabaeidae family was the most prevalent with 6 species, followed by Cerambycidae with 5 species. Families such as Chrysomelidae, Carabidae, Tenebrionidae, Coccinellidae, and Curculionidae each had 3 species, while Endomychidae, Dermestidae, Anthribidae, Staphylinidae, Attelabidae, Erotylidae, Cantharidae, and Hydrophilidae were represented by a single species each. A well-balanced community was revealed by Simpson's diversity index (0.9486), distribution of coleoptera which is fairly even indicated by Shannon's Equitability Index of 0.8969. According to Pielou's Evenness Index (0.8969), species are spread equally throughout the community. In addition to the high diversity and evenness values, the low Berger-Parker index value (0.1162) explains that the most abundant does not dominate the community. It is crucial to comprehend species diversity and distribution patterns in order to assess the resources and complexity of the ecosystem in the study area. For the first time, the coleopteran insect fauna will be documented from the Sree Krishna College campus and nearby area.

Keywords: Coleoptera, composition, diversity, species, taxonomy

Introduction
Insects are the most successful and diversified group of multicellular animals on Earth (Losey and Vaughan, 2006) [8]. They play a major role in pollination, pest management, decomposition, and the upkeep of wildlife species. Coleoptera is the most varied order within the class Insecta in the animal kingdom, which includes weevils and beetles. There are around 3,89,487 species of Coleopterans known to exist worldwide (Zhang, 2018) [12], of which roughly 22,334 have been documented from India (Chandra *et al.* 2018) [5]. Coleopterans perform a crucial ecological function in all types of habitats and comprise 38% of all insects. They are found all throughout the world, with the exception of regions that are constantly covered in ice. Elevation, temperature, relative humidity, and vegetation all affect coleopteran diversity and abundance. They are regarded as both a potential agricultural pest and an essential part of ecosystem services since they provide food for birds, amphibians, and mammals. Coleoptera are primitive insects that are classified into two suborders, Adephaga and Polyphaga. The abundance and diversity of coleopterans vary according to vegetation, temperature, relative humidity, and elevation.

The majority of beetles have a hard, robust exoskeleton that covers and shields their body, and their forewings have been altered to become elytra, or protective covers. Numerous species are herbivores that have evolved in different ways to consume the roots, stems, leaves, or reproductive organs of their host plants. Certain species dig tunnels in wood or beneath bark, while others live on fungus and burrow into plant tissues. A large number of beetles are predators (Hagen *et al.*, 1999) [7]. They are found in the soil or on vegetation and prey on a wide range of invertebrate hosts. As scavengers, certain beetles mostly consume decaying wood, carrion, faeces, and other dead organic waste. There are even a few parasitic beetles, some of which are external parasites of mammals, some of which are internal parasites of other insects, and some of which infiltrate termite or ant nests. Numerous beetles are considered serious pests of stored goods and agricultural plants. They target processed fibres, cereals, and wood products in addition to all portions of living plants. As organic nutrient decomposers and recyclers, scavengers and wood boring beetles are beneficial. The predatory species such as lady beetles are significant biological control agents for scale insects and aphids (Chandra, 2011) [4]. The present study has been conducted to investigate the diversity and distribution of coleopteran fauna in the Sree Krishna College which will provide preliminary information to future studies.

Materials and methods
The campus and nearby area were surveyed and collected a total of 241 specimens during the study period from July 2023 to February 2024 [10]. The selected study area is Sree Krishna College Campus which is situated in Thrissur district of Kerala. It is located between 10.6072° N and 76.0881° E with an elevation of 11.13 meters. Total area is 40 acres Sampling was done during the morning (7.00 am to 10.00 am) and evening (16.00 pm to 18.00 pm) time to maximize the species richness. Coleopterans were collected by adopting standard sampling methods, viz. hand-picking, light trap, net-sweeping, and pitfall trap. In addition, visual sighting and photo documentation were also carried out. Identification was done by using standard reference books and published articles according to their morphological traits till species level or morphospecies. The species identified were confirmed by comparing with the authentic specimens from the repository.

Statistical analysis

Data was analysed statistically to determine species diversity, species richness, species abundance, and evenness. Microsoft Excel was used to construct different graphs according to analysed data. The data analysis discussed in this study includes the abundance of the species (n), the richness of the species (s), the diversity of the species (H) and the evenness of the species (E). The abundance of the species is the number of individual species found while the richness of the species is based on the number of species appear in the location of the study. The diversity indices are quantitative measures of recorded species. The Shannon-Weiner diversity index (H'), Simpson's diversity index (D'), Simpson's Eveness (E), Margalef Richness, Berger-Parker Dominance (d) were calculated using using the following formula:

Shannon's diversity index, H' = - å (pi In Pi)

where H'= Shannon Index, Pi = Proportion of individuals belonging to the i^{th} species, ln = Natural logarithm (natural number)

Simpson's value, D = ∑ ni (ni-1) /N (N-1)

Where ni = the number of individuals of a species, N = Total number of all individuals

Margalef's index (R) =S-1/In(N)

where R= Margalef's richness index, S= total of species, N= total no of individual sample

Berger-Parker's Index (d)= Nmax / N or Berger-Parker Compliment index (1 d)

where Nmax = the number of individuals in the most abundant species, N=total number of individuals in the sample.

The evenness of the species is determined by Pielou's evenness index using the following formula: J = H/ln(S); Where E = evenness; S = the number of species.

Results

A total of 241 individuals of coleopterans belonging to 34 species, 34 genera under 15 families were observed during the study. The abundance of coleopteran species, along with their taxonomic position, relative abundance and pest statuses of recorded species, are presented in Table 1, and the species diversity and richness among different coleopteran families are shown in Table 2.

Table 1: Checklist of Coleopteran insects observed in the Sree Krishna College and nearby area

Family	Scientific Name	Common Name	Status	Abundance (Nos.)	Relative abundance (%)
Scarabaeidae (Scarab beetle)	*Aphodius sps.*	Small dung beetle	Decomposers	4	1.66
	Oryctes rhinocerous	Coconut palm beetle	Pest	16	6.64
	Onthophagus cervus	Asiatic Garden Beetle	Decomposer	14	5.81
	Maladera formosae	Oriental beetle	Pest	11	4.56
	Anomala orientalis	Dung beetle	pest	12	4.98
	Leucopholis lepidophora	Grub beetle	pest	16	6.64
Cerambycidae	*Batocera rufomaculata*	Mango stem borer	Pest	18	7.47
	Cleonaria bicolor	Long-horned Beetle	Pest	3	1.24
	Leiopus linnei	Longhorn beetles		4	1.66
	Ropica signata	Flat-faced long-horned beetles	Pest	3	1.24
	Xylotrechus subscutellatus	Longhorn beetle	Pest	6	2.49
Chrysomelidae	*Strabula rufa*	Flea beetle	Pest	2	0.83
	Altica cyanea	Blue metallic flea beetle	Predator	3	1.24
	Sphenoraia hopei,	Leaf beetle	Pest	6	2.49
Carabidae	*Cerapterus pilipennis*	Flanged bombardier beetle	Predator	4	1.66
	Macrocheilus bensoni	Ground beetle	Predator	3	1.24
	Anisodactylus sps.	Ground beetle	Predator	5	2.07
Coccinellidae	*Cheilomenes sexmaculata*	Six-spotted zigzag ladybird	Predator	21	8.71
	Adalia bipunctata	Two-spotted ladybird	Predator	8	3.32
	Coccinella transversalis	Transverse ladybird	Predator	28	11.62
Curculionidae	*Myllocerus viridanus*	Ash weevil	pest	4	1.66
	Rhynochophorus ferrugineus	Red palm weevil	pest	8	3.32
	Otiorhynchus sulcatus	Black Vine weevil	Pest	14	5.81
Tenebrionidae	*Tenebrio molitor*	Mealworm beetle	Pest	3	1.24
	Gonocephalum dorsogranosum	Darkling beetle Dusty brown beetle	Pest	7	2.90
	Luprops tristis,	Mupli beetle	pest	4	1.66
Dermestidae	*Attagenus unicolor*	Black carpet beetle	pest	2	0.83
Anthribidae	*Dissoleucas niveirostris*	Fungus Weevil	Decomposer	3	1.24
Staphylinidae	*Paederus littoralis*	Rove beetle	predator	1	0.41
Attelabidae	*Hoplapoderus gemmatus*	Leaf-rolling weevil	pest	3	1.24
Endomychidae	*Indalmus distinctus*	Fungus beetles	Decomposer	1	0.41
Erotylidae	*Amblyopus sps.*	Pleasing fungus beetles	pest	1	0.41
Cantharidae	*Podabrus flavicollis*	Soldier Beetle	Predator	1	0.41
Hydrophilidae	*Hydrophilus triangularis*	Giant black water beetle	Predator	2	0.83
				241	

Among the all-recorded species, *Coccinella transversalis* was the most dominant species with relative abundance of 11.62 % (28 individuals), followed by *Cheilomenes sexmaculata* with 8.71 % (21 individuals), *Batocera rufomaculata* with 7.47 % (18 individuals) (Table 2).

Table 2: Species diversity and richness among different coleopteran families.

Sub order	Family	Species richness	Genera	Relative species richness (%)	Abundance	
					Individuals	Relative abundance (%)
Adephaga	Carabidae (Ground beetles)	3	3	8.82	12	4.98
Polyphaga	Scarabaeidae (Scarab beetle)	6	6	17.65	73	30.29
	Cerambycidae (Long-horned beetles)	5	5	14.71	34	14.10
	Chrysomelidae (Leaf beetles)	3	3	8.82	11	4.564
	Coccinellidae (Ladybirds beetle)	3	3	8.82	57	23.65
	Curculionidae (Weevils)	3	3	8.82	26	10.78
	Tenebrionidae (Darkling beetle)	3	3	8.82	14	5.80
	Dermestidae (carpet beetles)	1	1	2.94	2	0.83
	Anthribidae (fungus weevils)	1	1	2.94	3	1.24
	Staphylinidae (Rove beetles)	1	1	2.94	1	0.41
	Attelabidae (leaf-rolling weevils).	1	1	2.94	3	1.24
	Endomychidae (Handsome fungus beetles)	1	1	2.94	1	0.41
	Erotylidae (pleasing fungus beetles)	1	1	2.94	1	0.41
	Cantharidae (soldier beetles)	1	1	2.94	1	0.41
	Hydrophilidae (water scavenger beetles)	1	1	2.94	2	0.83
		34			241	

The family Scarabaeidae was shown the highest relative abundance (30.29 %) followed by Coccinellidae (23.65 %), Cerambycidae (14.10 %), Curculionidae (10.78 %), Tenebrionidae (5.80 %), Carabidae (4.98 %), Chrysomelidae (4.56 %). The least abundant families were Endomychidae, Erotylidae and Cantharidae with relative frequency of 0.41 % respectively (Table 2 and Figure 1).

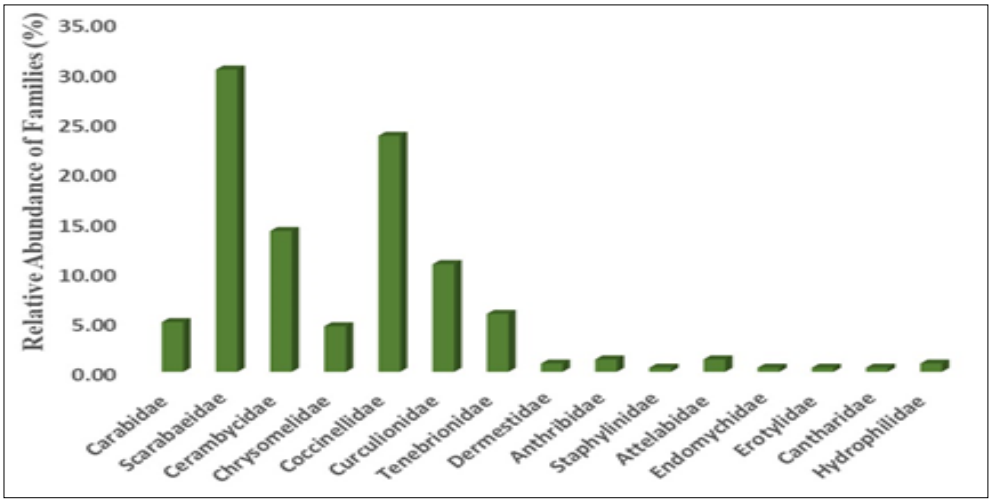

Fig 1: Relative abundance of different families of coleoptera

Of the total 15 families, Scarabaeidae was found to be the most dominant with 6 species, followed by Cerambycidae with 5 species. Chrysomelidae, Carabidae, Tenebrionidae, Coccinellidae and Curculionidae with 3 species whereas, Endomychidae, Dermestidae, Anthribidae, Staphylinidae, Attelabidae, Erotylidae, Cantharidae and Hydrophilidae represented only one species each (Figure 2).

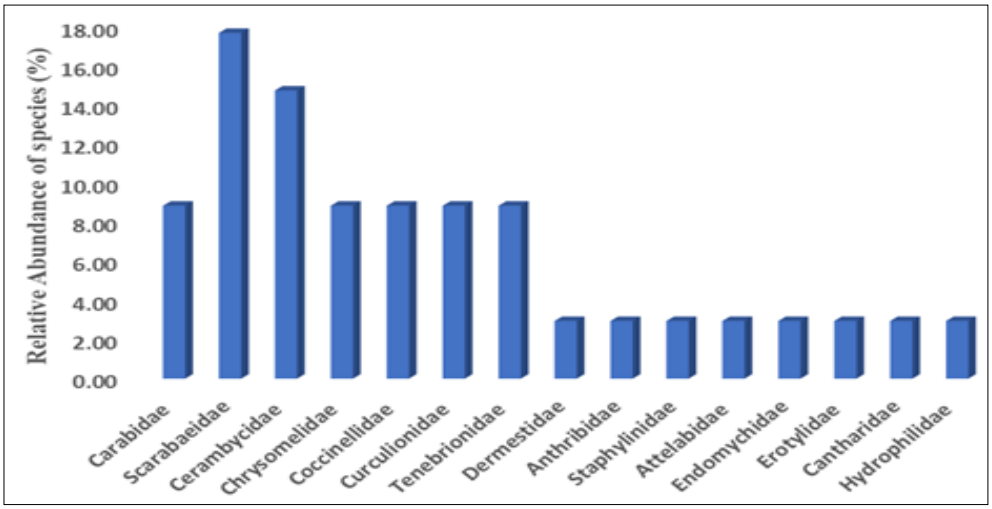

Fig 2: Relative abundance of species (%)

Pest and beneficial status were observed in different species as an ecological evaluation parameter. Among all the species reported, the highest numbers of Phytophagus pest species were from Scarabaeidae with relative abundance (22.82 %) followed by Cerambycidae (12.45 %), Curculionidae (10.79 %) Tenebrionidae (4.15 %), and Chrysomelidae (3.32 %). However, the beneficial insects were represented by Coccinellidae (23.65 %), Scarabaeidae (7.47 %), Carabidae (4.98 %) as predator and decomposers (Table 1). Across the field investigation, Simpson's Diversity Index (D'), Shannon Diversity Index (H'), and Dominance and Evenness (J) were calculated as 0.9497, 3.163, and 0.8969, respectively, which depicts that the coleopteran fauna is diverse in the study area (Table 3).

Table 3: Diversity indices of coleopteran population in and around Sree Krishna College Campus

Diversity indices	
Number of Taxa	34
Simpson's index, D = ∑n(n-1)/N(N-1)	0.0503
Simpson's Index of Diversity as 1 – D	0.9497
Shannon Diversity Index H = -Σpi * ln(pi)	3.163
Pielou's evenness index J=H/ln(S)	0.8969
Marg alef's Index, R = (S – 1) / In N	6.017
The Berger-Parker Index, d= N_{max}/N	0.1162
The Berger-Parker Index,1/d	8.606

Discussion

The current study aims to connect the richness and identification of Coleoptera in and around the campus of Sree Krishna College. The Scarabaeidae was found to be the most prevalent family (30.29%) among all the species gathered. Our findings are consistent with numerous studies who have reported that Scarabaeidae to be the most dominant group during their studies on the diversity of the Coleoptera community in the Reserve Forests of the Aravalli Range in Kerala (Surya Das *et al*., 2023) [14] and in Rajasthan, India (Ramesh Prajapat *et al*., 2025) [11]. Similar findings about coleopteran diversity in India's various tropical deciduous forest environments were reported in earlier research by Basu *et al*. (2017) [1] and Singh *et al*. (2018) [13]. Thus, a significant population of ground beetles in Gujarat indicates that these insects have a beneficial ecological role (Bhumi Thakkar and Pragna H. Parikh 2016) [2]. There are six species of coleoptera were obtained from the family Scarabaeidae viz., *Aphodius sps, Oryctes rhinocerous, Onthophagus cervus, Maladera formosae, Anomala orientalis* and *Leucopholis lepidophora.* (Table 1). The family Scarabaeidae includes both phytophagous (damaging) and coprophagous (beneficial) beetles, in contrast to other insect groups. The coprophagous species, which are represented by two species, have a significant ecological role in the burrowing and dung-burying habitats. This performs a number of ecological functions, including soil aeration, nutrient cycling and secondary seed dissemination (Chandra and Gupta, 2013) [3]. Cerambycidae (Long-horned beetles) was the second most abundant family from the study area. It includes species such as *Batocera rufomaculata, Cleonaria bicolor, Leiopus linnei, Ropica signata and Xylotrechus subscutellatus.* (Table 1). The majority of members are pests of different kinds of plants. Because of their phytophagous eating habits, leaf beetles, or Chrysomelidae, are a significant pest family (Meissle *et al*. 2009) [9]. In the present study, three species were reported making it the third most diverse family. Among these, two were pest species and one was biological control agent (Table 1). The family Carabidae include three species such as Cerapterus pilipennis, *Macrocheilus bensoni and Anisodactylus sps.* they are beneficial ground beetles that act as natural predators or harmless omnivores. According to Ghahari *et al*. (2010) [6], the usage of Carabidae beetles as a taxonomic study group in biodiversity and as bio-indicators in monitoring or site evaluation studies for nature conservation goals is growing. Thus, a significant number of ground beetles in the research area and their predator behaviour indicate that these insects play a beneficial ecological role (Thakkar and Parikh, 2016) [2]. Tenebrionidae comprised of *Tenebrio molitor, Gonocephalum dorsogranosum and Luprops tristis,* Tenebrionids typically consume plant-based materials such as wood, pollen, decomposing debris, leaf litter, fungus, and algae. A small number of species are predators, particularly wood boring beetles, but some are also scavengers. Certain tenebrionids are currently regarded as global pests of grain products that have been stored (Pritika Jangir *et al*., 2024) [10]. Tenebrionidae is one more family having the highest number of stored grain pest. Bulk grains and processed goods are heavily impacted economically by stored product insects. These insects may live on little amounts of food that build up in unreachable areas.

Three species of coleopteran insects were observed in the family Coccinellidae viz., *Cheilomenes sexmaculata, Adalia bipunctata and Coccinella transversalis*. Coccinellidae is a most prevalent beetle family, distributed worldwide (Satheesha *et al*., 2018 [12]; Vaibhav and Pulikeshi, 2020). According to Satheesha *et al*. (2018) [12], the majority of coccinellids are predatory, but they also consume non-prey items such honeydew, pollen, sap, nectar, and other fungi. When the desired prey or necessary food is in short supply, this tactic offers enough energy to make up for metabolic losses (Satheesha *et al*., 2018; Pritika Jangir *et al*., 2024) [10, 12]. Families like Dermestidae, Anthribidae, Staphylinidae, Attelabidae, Endomychidae, Erotylidae, Cantharidae and Hydrophilidae were very less diverse and habitat specific. Therefore, the present study will provide baseline data for better understanding of species composition of coleopteran fauna.

Conclusion

The study found that Scarabidae are the most diverse group of coleopteran families, and that *Coccinella transversalis* is the most prevalent species in and around the Sree Krishna College campus. It also found that a large number of beetle pests were present in the study area, indicating that the area provides favourable conditions for the growth and existence of different pests. This result highlights the need for appropriate control measures to keep them under control. The study also found beneficial coleopterans, such as *Coccinella, Cheilomenes,* and *Onthophagus*, which can act as predators of various insect pests and decomposers. Therefore, we propose that more research is necessary to comprehend the ecophysiological roles.

References

1. Basu P, Aditya G, Sanyal AK. Community structure of Coleoptera in Bethuadahari wildlife sanctuary, West Bengal, India. The Journal of Biodiversity Data Checklist,2017:13:2154. https://doi:10.15560/13.3.2154 .
2. Thakkar B, Parikh PH. A Study on diversity and abundance of coleopterans in Gujarat, India, Journal of Entomology and Zoology Studies,2016:4(5):1082-1089.
3. Chandra K, Gupta D. Taxonomic studies on dung beetles (*Coleoptera*: *Scarabaeidae*, *Geotrupidae*, *Hybos oridae*) of Chhattisgarh, India. Munis Entomology and Zoology,2013:8:331–360.
4. Chandra K. Insect diversity of Sikkim, India. Biodiversity of Sikkim-exploring and conserving a hotspot. Arrawatia, M.L., Sandeep Tambe (Eds). Information & Public Relations Department, Government of Sikkim, 2011, 181-206.
5. Chandra KD, Gupta Kushwaha S, Das P, Ghosh J. Arthro pod: *Hexapoda*. In faunal diversity of biogeographic zones: Islands. Records of Zoological Survey of India, 2018, 247-320. DOI: https://doi.org/10.60151/envec/DKOY4790
6. Ghahari H, Avgin SS, Ostovan H. Carabid beetles (*Coleoptera*: *Carabidae*) collected from different ecosystems in Iran with new records. Turkish Journal of Entomology,2010:34(2):179–195.
7. Hagen KS, Mills NJ, Gordh G, Mcmurty JA. Principles and applications of biological control. Science Direct, 1999, 383-503.
8. Losey JE, Vaughan M. The economic value of ecological services provided by insects. Bioscience,2006:56(4):311–323.
9. Meissle M, Pilz C, Romeis J. Susceptibility of Diabrotica virgifera virgifera (*Coleoptera: Chrysomelidae*) to the entomopathogenic fungus Metarhizium anisopliae when feeding on Bacillus thuringiensis Cry3Bb1- expressing maize. Applied and Environmental Microbiology,2009:75(12):3937–3943.
10. Jangir P, Meena G, Bairwa K, Sangwan S. Study of *Coleoptera* fauna at Tal Chhapar wildlife sanctuary, Churu, Rajasthan, International Journal of Entomology Research,2024:9(9):48-51.
11. Prajapat R, Meena P, Kumawat N, Meena S. Diversity and Seasonal Fluctuation of *Coleoptera* Community in the Reserve Forests of Aravalli Range at Jaipur, Rajasthan, India, Environment and Ecology,2025:43(1):89—96.
12. Satheesha D, Nikhath AJ, Vrushali MM, Jayaraj FC, Sreenivasa G. Preliminary study on composition and diversity of beetles (Order- *Coleoptera*) in and around Davangere University Campus, Davangere, Karnataka, Journal of Entomology and Zoology Studies,2018:6(4):1751-1758.
13. Singh AP, Mahajan S, De K, Uniyal VP, Bhardwaj AK. An assessment of coleopteran fauna of the forest of Siswan, Punjab. Indian Forester,2018:144:1107-1113.
14. Das S, Santhi, Jayasree. Studies on Coleopteran Diversity and Phylogenetic Analysis in Agroecosystem of Koduvayur, Palakkad District, Kerala, International Journal of Innovative Research in Technology,2023:(9):10.
15. Thakkar B, Parikh P. A study on diversity and abundance of coleopterans in Gujarat, India, Journal of Entomology and Zoology Studies,2016:4(5):1082-1089.
16. Ugare VP, Biradar PM. Survey on coleopteran diversity in different areas and seasons of Dharwad District (Karnataka) India, International Journal of Entomology Research,2020:5(1):42-48.
17. Zhang ZQ. Phylum *Arthropoda*. In: Animal Biodiversity: An Outline of Higher- level Classification and Survey of Taxonomic Richness (Addenda, 2013) (Ed. Zhang, Z.Q.). Zootaxa,2013:3703:17-26.