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A review on biodiversity of Scarabaeid beetles in India

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Abstract

The current review eamines 17 research articles about Scarabaeid beetles Biodiversity, which were presently collected from all over India. It includes classification, methodology, collection, characteristics, identification, distribution, dimension, conservation status and trouble. This review summarizes the status, biodiversity of Scarabaeid beetles in India.

Keywords : Scarabaeid beetles, Biodiversity, Coleoptera, India, Species.

Introduction

Coleoptera (*Gk. Coleos*-sheath, *ptera*-wing) are largest group of organisms at order level and are comprised of beetles. The family Scarabaeidae is one of the largest, most diverse family. It is divided into two groups, Laparosticti (Dung beetles) and Pleurosticti (Chafers) based on position of posterior spiracles on the body. Scarabaeid beetles live in variety of different habitat, desert, grassland, agricultural land, woodland. The family includes 33,504 species, out of which about 2,211 species are reported from India. Scarabaeid beetles present remarkable species diversity and striking morphological variation. Biodiversity of insects in forestry parlance can be summarized with two of its components, species richness and evenness. The "richness" indicates the number of species present in designated area whereas "evenness" stands for the relative abundance of each species. This review focuses on a few specific Scarabaeid beetles studies on scarab beetles, dung beetles in general that are related to Biodiversity. Many of research papers collected provide rewarding information that will help our recognition for product group in advising Biodiversity methods for scarabaeid beetles in India.

Biodiversity

During the investigation, Scarabaeid beetles were discovered in and around Solapur City of Maharashtra was collected during 2025-2017. Surveyed and collection of beetles were carried out at one month interval in morning and evening. The study revealed, 59 species of scarabaeid beetles belonging to 38 genera of 8 subfamilies were reported. Subfamily Scarabaeinae was dominant with 25 species followed by subfamily Rutelinae, Cetoniinae, Melolonthinae, Dynastinae, Aphodinae, Hybosorinae and Geotrupinae with 9, 9, 8, 4, 2, 1 and 1 species respectively. Rutelinae and Cetoniinae was the family the most individuals recorded. (Aland S R. 2019)[1]. Study reported from Durgapur, West Bengal, India from January 2012 to December 2012. In this study, A total 9 families were reported. Durgapur has rich floral diversity that supports large growth of fauna. The present study demonstrate that college campus and township area much diverse than wetland. Each of the site shows highest diversity in June-July (monsoon). This study suggest that an industrial town with high pollution threats, Durgapur can nonetheless harbor a large number of beetles. (Moitreyee Banerjee. 2014)[2]. Around the Kanger Valley National Park, Chhattisgarh, India, studies on the scarab beetle fauna found 22 species belonging to 10 genera and 6 subfamilies. Family Scarabaeidae were identified and recorded for the first time from KVNP out of total 22 species, 15 species are termed as dung beetles and categorized into three major nesting strategies; dwellers, rollers and tunnelers. The species included in the subfamilies; Rutelinae, Dynastinae, Melolonthinae and Cetoniinae. This study on faunal account of scarab beetles of KVNP will undoubtedly help in the exploration of rich faunal resources of Chhattisgarh. (Kailash Chandra *et al.*,2012)[3]. As a result of this investigation, 94 species belongs to 9 subfamilies; Subfamily Hybosorinae was dominant with 2 species followed by subfamily Orphinae, Chironinae, Aphodiinae. Scarabaeinae, Melolonthinae, Rutelinae, Dynastinae And Cetoniinae with 1, 4, 5, 66, 12, 1, 5 respectively. This paper presents a checklist of scarabaeid beetles from Madhya Pradesh. (Kailash Chandra. 2000)[4]. A total 43 species of beetles belongs to 15 genera were collected from study locations in the Cattle grazing lands of Phaltan Tahesil, Satra, Maharashtra seven site were selected during June 2010 to March 2013. Coprinae was dominant subfamily with 32 species followed by Aphodiinae, Scarabaeinae and Geotrupidae with 7, 3, 1 species respectively. The important genera in this region is Onthophagus followed by Aphodius, Gymnopleurus, Onitis, Catharsius, Helocarpis with 11, 7, 6, 5, 3, 2 species respectively. (Gaikwad A R. 2015)[5]. During the survey, present study gives an idea of Scarab beetles in Nagaland study area that revealed the biodiversity of 62 species belonging to 34

genera under 5 subfamilies were studies. i.e. Scarabaeinae, Melolonthinae, Rutelinae, Cetoniiae and Dynastinae under the family Scarabaeidae from Nagaland state. This study provides basic information and inventory on present status, composition and diversity of scarab beetles in Nagaland. There is also need to be protected work resulted in database of scarabs which will help in future work for its conservation, preservation and addition of the local biodiversity of scarab beetles. (Joyjit Ghosh *et al.*, 2020)[6]. A total 24 Coleopteran species from 3 families, 6 subfamilies were recorded during investigation from Nashik, Maharashtra, India. Family Scarabaeidae showed prominent species richness and abundance amongst the three. Subfamily Rutelinae and Scarabaeinae belonging to this family was dominant with 7 and 6 species respectively. Whereas, both subfamilies Dynastinae and Melolonthinae were 2 species each *Adorectus* belonging to family Scarabaeidae and Subfamily Rutelidae was the richest genera with 6 species. *Anomala ruficapilla* belonging to same subfamily showed presence as a singleton sp. Varied genera were note in Subfamily Scarabaeinae. Species distribution of dung beetle fauna in various region was evaluated. The outcomes showed that the diversity of the dung beetle fauna of Nashik district is very high. (Pranil Jagadale *et al.*, 2017)[7]. The present study, documented, A total 50 species represented by 25 genera, 17 tribes, 7 subfamilies belonging to Hybosoridae, Geotrupidae and Scarabaeinae were documented from the surveyed areas. (Nortern, Western Ghats, Maharashtra). Among the studied specimens the subfamily Scarabaeinae emerged as the dominant subfamily with 22 species followed by Melolonthinae (8 species), Rutelinae (8 species), Cetoninae (6 species), Dynastinae (4 species) and Hybosorinae and Dynastinae with 1 species each. The dominant subfamily Scarabaeinae was represented by 4 tribes, i.e., Onthophagini, Coprini, Oniticellini, Onitini and Gymnopleurini. In their study on diversity of Scarabaeid beetles of Barnawapara Wildlife Sanctuary *Onthophagus* it is most diverse genus. (Aparna Kalawate. 2018)[8]. During the investigation, 99 species belonging to 60 genera under 13 families of Coleoptera from Thar desert of Rajasthan during May 2003-June2003. Majority of the specimens were collected during the day from agricultural as well as barren land or sand dune areas by the free sweeping method. Some group of beetles were collected during night with the help of screen light trap with a strong source of white light. This paper covers all the district of Thar desert. A total 22 species belonging to Scarabaeidae family. (Kazmi S I *et al.*, 2004)[9]. The present work aim to study scarabaeid beetles biodiversity at selected site in Nadia district, West Bengal, with a preliminary checklist from India. A total 78 scarab species and among them 22 are *Onthophagus* species. All these are new reported for the district. From the of the present study, all the recorded taxa are provided with distribution, material examined, diagnostic characters and remarks. (Kharel Bhim *et al.*, 2020)[10].

The present study was conducted to diversity of scarabaeid beetles in and around Amba Reserved Forest of Western Ghat reegion Kolhapur District, Maharashtra. During the study period, 59 species of scarabaeid beetles from 38 genera of 8 subfamilies were reported. The maximum number of species belongs to the Subfamily Rutelinae and Cetoniinae, which was represented by 9 species. Subfamily Scarabaeinae was dominant with 25 species followed by Subfamily Rutelinae, Cetoniinar, Melolonthinae, Dynastinae, Aphodinae, Hybosorinae and Geotrupinae with 9, 9, 8, 4, 2, 1 and 1 species respectively. This study will be helpful to examine role of coprophagous and phytophagous beetles in the forest ecosystem. It is also helpful to study organization composition, diversity and their elevation. (Amol B Mamlayya *et al.*, 2012)[11]. The present study, conducted at four study sites at South Indian states, viz., Andhra Pradesh, Karnataka, Kerala and Tamilnadu. The occurrence of the beetles was influenced by the copping pattern, the soil type and the geographical co-ordinates. A total 17 species representing 5 subfamilies were recorded from study area. The percentage distribution of scarabaeid beetles in across the different states indicates that, Scarabaeinae (17.64%), Melolonthinae (38.23%), Cetoniinae (17.66%), Rutelinae (20.58%) and Dynastinae (5.88%) respectively. In addition, environmental factors, salinity, temperature, moisture, and wind velocity play a crucial role on the development, diversity and ecology of scarabaeids. Melolonthinae had the most species and Dynastinae has fewest. (Murthy K S. 2020)[12]. A total 56 species belonging to 4 subfamilies, Melolonthinae, Rutelinae, Cetoniinae and Dynanstinae were recorded from the eight locations in the Northwestern Himalayan region of Himachal Pradesh. In the present study 13,569 adults of scarabaeid beetles were recorded from individual composition. The five most dominating species were *B. coriacea, A. lasiopygus, A. lineatopennis, M. insanabilis and H. longipennis.* Melolonthinae was most dominant with 29 species (51.79%) of the total species, Rutelinae with 19 species (33.93%). Anomala was the most effective genus with 17.86% of total species followed by Brahmina (16.07%). Scarab beetles were collected in June and July. Result of this study revealed scarabaeid beetles is much diverse in Himalayan region. (Mandeep Pathania *et al.*, 2015)[13]. During the study period 16 species belonging to 9 genera, 2 subfamilies viz., Scarabaeinae and Aphodiinae and 1 family Scarabaeidae and superfamily Scarabaeoidea were studied from Sahaspur, Uttarakhand (India), during the month of October

2016-march 2017. Species diversity of the scarab beetles of Uttarakhand is greatest extent. 4 species *Onthophagus cervus* (Fabricius), *Aphodius rufipes* (Linnaeus), *Onthophagus mopsus* (Fibricius), *Aphodius erraticus* (Linnaeus) are new record to the fauna of Uttarakhand. This study focused on species divercity of the scarab fauna in the region of Sahaspur, Dehradum, Uttarakhand. (Amar Singh *et al.*, 2017)[14].

A total 26 species of scarab beetles belonging to 14 genera and 8 subfamilies were recorded from study locations in the Kolkas Region of Melghat Tiger Reserve (MTR), District Amravati, Maharashtra, India during May to October 2009. The species included in the subfamilies; Geotrupinae, Hybosorinae, Orphinae, Scarabaeinae, Melolonthinae, Rutelinae, Cetoniinae and Dynastinae with 1, 1, 1, 15, 2, 2, 2, 2, 1 respectively. Scarabaeinae was the most powerfull subfamily in the species rankness. *Onthophagus* Latreille, 1802 is the dominant genus observed in the study area. (Thakare V G *et al.*, 2009)[15].

The present study, was conducted to Scarabaeid beetles in different 5 farming Areas in Nepal. A total scarabaeid beetles, representing 29 genera and 77 species, were collected by night traps %), Melolonthinae(40.55%) Dynastinae (5.44%) and Cetoniinae (0.3%) with 38, 26, 9 and 4 species from 8, 12, 6 and 3 genera 4 species from 8, 12, 6 and 3 genera, respectively. The highest number of beetles collected were from the subfamily Ruteline and the lowest number collected comes from the Cetoniinae subfamily. Relatively large size beetles observed during February to June and small body size beetles observed during July to January. This study has attempted to explore the species diversity and richness of scarabaeid beetles. (Yubak D J *et al.*, 2009)[16]. During the investigation, 5863 specimens of scarab beetles were captured in the aproforest area. In crop area, 2314 scarab beetles specimens were collected representing 41 species. Similarly 3549 scarab beetles specimens were collected belonging to 57 species in the forest area. When diversity of both the area was compared, it was resulted scarab beetles was more diverse in the forest area than crop area. *Anomola dorsalis* has more population in agroforest area as well as crop area. This data obtained during May-October 2002 were studied from Faisalabad. (Kashif Zahoo *et al.*, 2003)[17].

Conclusion

Scarabaeid beetles diversity is a large world wide distributed group of beetles. The review made to combine all information of biodiversity of India. The biodiversity in the different fauna were studied and analysed by different authors. Report have been made that the biodiversity of scarabaeid beetles have been correlates with prohibit of growth and development of these beetles. Review have also been made that biodiversity of scarabaeid beetles are reducing due to nonagriculture. Still and all, limited works are obtainable to known effect of urbanization regarding their diversity as well as their phylogenesis activities. Therefore, the research of scarabaeid beetles in India nacessory to be treated due to their large impact on biodiversity.

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