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# Beetle diversity (Insecta: Coleoptera) in and around Sri Lankamalleswara Reserve Forest, Kadapa - Eastern Ghats of Southern Andhra Pradesh - India

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**Abstract**

A major Investigation of beetle faunal diversity and composition was studied in and around Sri Lankamalleswara Reserve Forest, Kadapa, Eastern Ghats of Southern Andhra Pradesh, and India from January to December 2021. Beetles were collected using standard trapping methods from three different sites selected on the basis of their specific habitat differences, identified up to the level of family, and counted monthly. The study presents a record of 35 species belonging to 28 genera under 13 families of the order Coleoptera (Linnaeus, 1758) from Kadapa district of Andhra Pradesh, India. The families viz. Carabidae (4 genera and 4 species), Gyrinidae (1 genus and 1 species), Dytiscidae (1 genus and 2 species), Geotrupidae (1 genus and 1 species), Scarabaeidae (9 genera and 10 species), Buprestidae (1 genus and 4 species), Coccinellidae (2 genera and 2 species), Tenebrionidae (3 genera and 3 species), Chrysomelidae (1 genus and 2 species), Cerambycidae (1 genus and 3 species), Curculionidae (2 genus and 2 species), Meloidae (4 genera and 4 species) and Cetoniidae (1 genus and 1 species).

**Key words :** Beetle diversity, Coleoptera, Sri Lankamalleswara Reserve Forest, Kadapa.

Insects are one of the best components that play a major role in biological diversity. This is due to its ability to respond quickly towards any changes in ecosystems. Therefore, the insect is known as a biological indicator for the ecosystems. The beetle was chosen in this study since it was the most diverse insect's group and plays a major role in the food chain.[6] Coleoptera is an order of insects commonly called beetles. The word "Coleoptera" is from the Greek keleos, meaning "sheath," and pteron, meaning "wing," thus "sheathed wing." The reason for the name is that most beetles have two pairs of wings, the front pair, and

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"elytra," being hardened and thickened into a sheath-like or shell-like protection for the rear pair and for the rear part of the beetle's body. The order Coleoptera includes more species than any other order, constituting almost 25% of all known life-forms[6]. About 40% of all described insect species are beetles (about 400,000 species) and new species are discovered frequently. Some estimates put the total number of species, described and undescribed, at as high as 100 million, but a figure of 1 million is more widely accepted. The diversity of beetles is very wide. They are found in all major habitats, except marine and the Polar Regions. There are particular species that are adapted to practically every kind of diet. The family Scarabaeidae is the largest family of insects which contains more than 30000 species in the world. Coleoptera is found in nearly all natural habitats, that is, vegetative foliage, from trees and their bark to flowers, leaves, and underground near roots, even inside plants like galls, tissue, including dead or decaying ones. Majority of beetle species are phytophagous in both the larval and adult stages, living in or on plants, wood, fungi, and a variety of stored products, including cereals, tobacco, and dried fruits. Because many of these plants are important for agriculture, forestry, and the household, the beetle can be considered as a pest[8]. Beetles are not only pests but also can be beneficial, usually by controlling the populations of pests. One of the best, and widely known, examples is the ladybug or ladybird (family Coccinellidae). Both the larvae and adults are found feeding on aphid colonies. Other ladybugs feed on scale insects and mealy bugs. If normal food sources are scarce, they may feed on other things, such as small caterpillars, young plant bugs, honeydew, and nectar. Ground beetles (family Carabidae) are common predators of many different insects and other Arthropods, including fly eggs, caterpillars, wireworms, and others. Dung beetles (Coleoptera, Scarabaeidae) have been successfully used to reduce the populations of pestilent flies and parasitic worms that breed in cattle dung. Dung beetles are taxonomically as well as a functionally very important component of the terrestrial ecosystem.

Present research focuses on the diversity of beetles in Sri Lankamalleswara Reserve Forest, Kadapa, and Eastern Ghats of Southern Andhra Pradesh. It is very rich in biodiversity. The beetles belonging to the dominant order of animal kingdom Coleoptera and found everywhere in natural habitats except marine and the Polar region. About 40% (4, 00,000) of all described insect species are beetles[8] and approximately 15,088 species were recorded India[13]. There are particular species that are adapted to practically every kind of diet. Beetles are detritus feeders, some feed on flesh, dung, fungi, plants, pollen, flower and fruit eaters as well as some are predatory invertebrates and some are parasites. Beetles are harmful pest attacking plants, processed fibers, grains and wood products, but can also be beneficial, usually by controlling the populations of serious pests of agricultural plants; examples ladybird feed on aphid colonies, scale insects, thrips and mealy bugs that damage crops. Beetles serve as prey of various invertebrates and vertebrates including insects, fish, reptiles, birds, and mammals. The area is divided into three study sites in order to get an idea of the variety of beetles found. The study is restricted to the family level of the order Coleoptera. 9 distinct families of

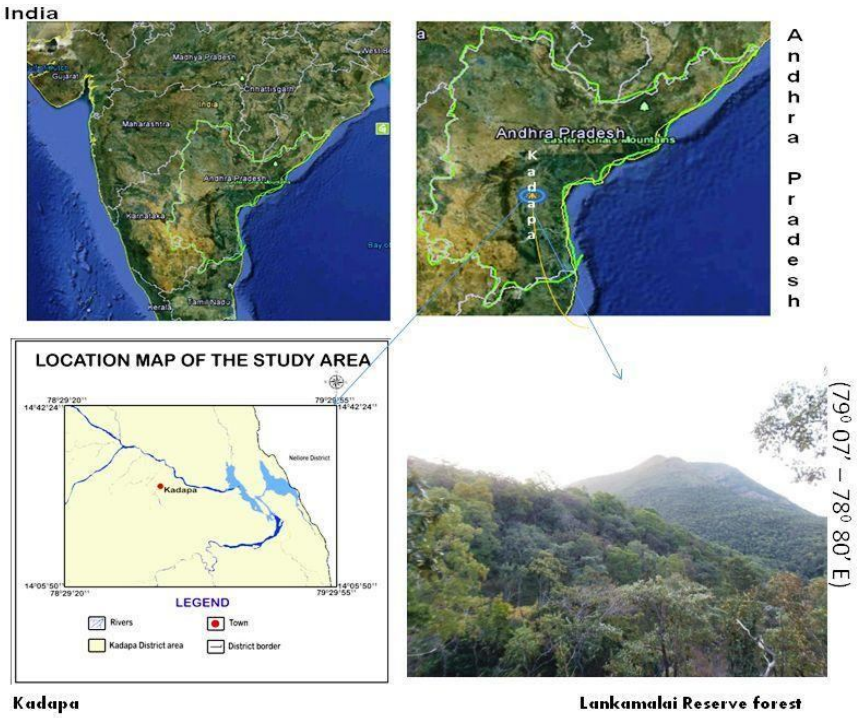


Fig. 1. Study area, Sri Lankamalleswara Reserve Forest, Kadapa.

beetles were reported from the three sites over a long one-year survey. Usually, diversity studies are conducted in ecologically sound areas with special focus on insects as they are the most diverse group among fauna. A study of the most diverse group of insects, that is, beetles, not only will help to assess the diversity of this area but also will help to carry out further studies to conserve the biodiversity of this Sri Lankamalleswara Reserve Forest, Kadapa. The record of the diversity of beetles from Sri Lankamalleswara Reserve Forest, Kadapa is available, therefore a preliminary study was conducted and an attempt was made to find out the diversity of beetles of Kadapa district. Curculionidae contributed 02 species each with 5.71% each and family Gyrinidae, Geotrupidae, Cerambycidae, and Cetoniidae contributed 01species each with 2.85% each.

*Study area :*

Sri Lankamalleswara Wildlife Sanctuary (14°45' - 14°72' N & 79°07' - 78°80' E) was a wildlife sanctuary headquartered in Kadapa, Andhra Pradesh, India (Fig. 1). It was the only habitat in the world which provides a home for the Jordon's courser, a highly endangered bird species[9]. In addition to that it was also a home to nearly 176 families of vegetation and living organisms[10]. The Sanctuary provides a home to nearly 1400 plant species and nearly 176 families of vegetation and living organisms. It has dry deciduous mixed thorn forests with deep gorges and steep slopes. Red Sanders, an endemic species, can be found here[11,12].

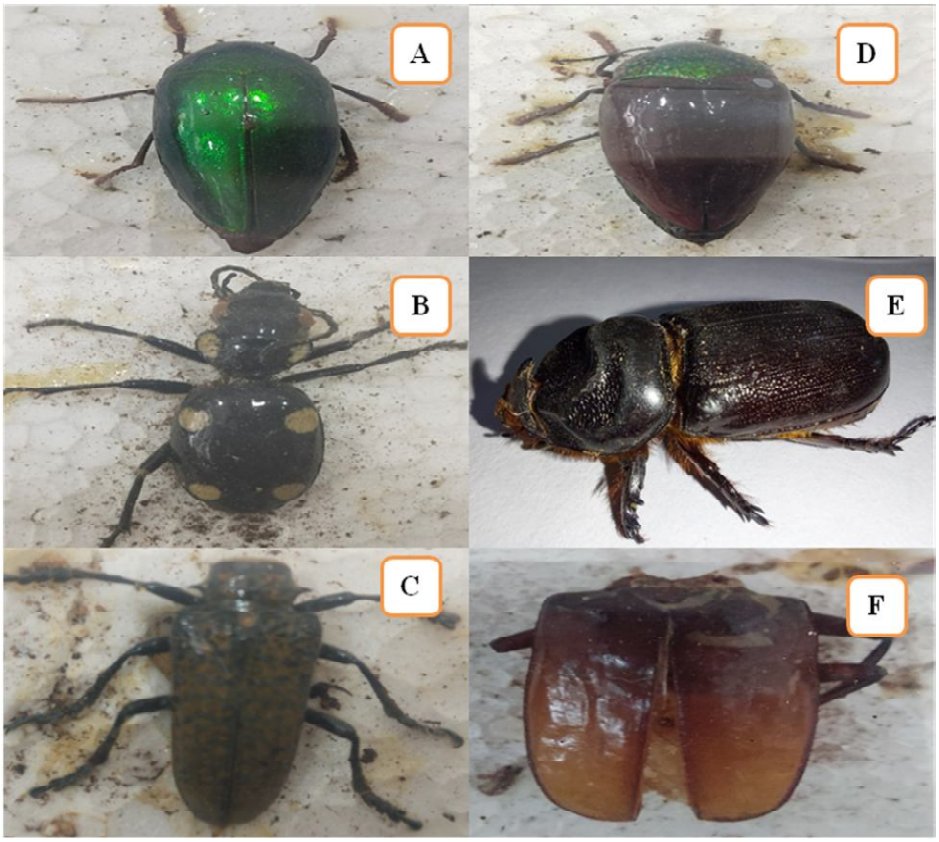


Fig. 2. Some Beetle diversity from Lankamallai Reserve Forest Kadapa A. Metallic Wood boring beetle (*Sternocera ruficornis*); B. Six spot ground beetle (*Anthia sexguttata*); C. Longhron beetle(*Prosopocera*); D. Jewel beetle(*Sternocera sternicornis*); E. Dung beetle ( *Scarabaeus viettei*); F. Palo verde beetle(*Derobrachus geminatus*).

Its fauna includes the panther, sloth bear, cheetal, sambar, chowsingha, chinkara, nilgai, wild boar, fox and the Jordon's courser and most diverse insects group like Beetles were observed from different places of Sri Lankamalleswara Wildlife Sanctuary[10].

Beetles were observed from different places of Sri Lankamalleswara Reserve Forest, Kadapa during January to December 2021 to determine their diversity. Photographs (Fig. 1) of the beetles were taken with help of digital camera Olympus and were identified with the help of standard keys like Bousquet [4] and available literature[14] as well as different websites from the internet.

Thirty five species belonging to 28 genera under 13 families of the order Coleoptera from Sri Lankamalleswara Reserve Forest, Kadapa, India have been noted. Some of these are Shown in fig. 2. The observed beetle species are tabulated in Table-1. Family Scarabaeidae was found to be dominant with 9 species which

constituted 25.71% besides family Carabidae and Meloidae contributed 04 species each with 11.42% and Buprestidae, Tenebrionidae contributed 03 species each with 8.57% each as well as Dytiscidae, Coccinellidae, Chrysomelidae, Dabhade *et al*.,[7] studied 25 beetles species belonging to the 8 superfamilies and 11 families from Mangrulpir Tahsil, Dist. Washim, Maharashtra. Bhawane *et al.,*[3] recorded 29 species under 22 genera distributed in 4 subfamilies of family Scarabaeidae Kolhapur district, Maharashtra. Chandra and Gupta[5] observed 43 species belonging to 25 genera, 16 tribes and 8 subfamilies in 2 families, Hybosoridae and Scarabaeidae of the superfamily Scarabaeoidea of Barnawapara Wildlife Sanctuary, Chattisgarh, India. Thakare and Zade[15] noticed 10 species belonging to 6 different families' viz. Gyrinidae, Tenebrionidae, Carabidae, Scarabaeidae, Meloidae, and Buprestidae of beetles from various habitats at Melghat Tiger Reserve, Maharashtra. The work on a beetle diversity of Melghat area was done by Thakare *et al.*[16]. Chandra *et al.,*[5] recorded some new species of beetles of Jabalpur, Madhya Pradesh (India). Aland *et al*.,[1] surveyed 152 species under 101 genera belonging to 25 families of beetles; they concluded family Scarabaeidae to be dominant with 65 species from Amba Reserve Forest, Western Ghat, and Kolhapur. Banerjee[2] reported 9 families of Coleoptera from Durgapur, West Bengal. India.

The data revealed will be an addition to our knowledge of the beetle diversity of Sri Lankamalleswara Reserve Forest, Kadapa. A long-term study was needed to observe the species occurrence in all seasons and their interaction with the environmental changes for better results. It provides useful information about diversity of beetles in the said area as well as provides baseline data for upcoming researchers and gives wide scope for further study.

Table-1. Beetle diversity from Lankamallai Reserve Forest Kadapa

| S. no | Family | Scientific name |
|---|---|---|
| 1 | Carabidae (Latreille, 1802) | *Carabus auroaitens* (Fabricius, 1792) |
| | | *Patrobus longicornis* (Say, 1823) |
| | | *Anthia sexgutatta* (Fabricius, 1775) |
| | | *Chlaenius erythropus* (Germar, 1824) |
| 2 | Gyrinidae (Latreille, 1807) | *Dineutus ciliatus* (Forsberg, 1821) |
| 3 | Dytiscidae (Leach, 1815) | *Cybister tripunctatus* (Olivier, 1795) |
| | | *Cybister fimbriatus* (Say, 1823) |
| 4 | Geotrupidae (Latreille, 1807) | *Anoplotrupes stercorosus* (Hartmann, 1791) |
| 5 | Scarabaeidae (Latreille, 1807) | *Onthophagus longicornis* (Latreille, 1802) |
| | | *Helicopris midas* (Fabricius, 1775) |

| | | |
|---|---|---|
| | | *Catharsius* (Catharsius) sagax (Quenstedt, 1806) |
| | | *Helicopris collasus* (Bates,1868) |
| | | *Copris elphenor* (Klug 1855) |
| | | *Heliocopris bucephalus* (Fabricius, 1775) |
| | | *Scarabaeus viettei* (Burm.) |
| | | *Onthophagus* (Digitonthophagus) gazella (Fab. 1787) |
| | | *Scarabaeus viettei* (Linnaeus 1758) |
| | | *Oxycetonia versicolor* (Fabricius, 1775) |
| 6 | Buprestidae (Leach, 1815) | *Sternocera chrysis chryisidioides* (Castelnau & Gory, 1837) |
| | | *Sternocera ruficornis* (Castelnau & Gory, 1837) |
| | | *Sternocera aequisignata* (Saunders, 1866) |
| | | *Sternocera sternicornis* (Linnaeus 1758) |
| 7 | Coccinellidae (Latreille, 1807) | *Cheilomenes sexmaculata* (Fabricius, 1781) |
| | | *Coccinella septempunctata* (Linnaeus, 1758) |
| 8 | Tenebrionidae (Latreille, 1807) | *Tenebroides corticalis* (Melsheimer, 1844) |
| | | *Opatrum depressum* (Fabricius, 1801) |
| | | *Tribolium castaneum* (Herbst, 1797) |
| 9 | Meloidae (Gyllenhal, 1810) | *Mylabris postulata* (Thunberg, 1821). |
| | | *Cylindrothorax tenuicolis* (Pallas, 1798) |
| | | *Lytta vesicatoria* (Linnaeus, 1758) |
| | | *Epicauta callosa* (LeConte, 1866) |
| 10 | Cerambycidae (Latreille, 1802) | *Batocera rufomaculata* (DeGeer, 1775) |
| | | *Prosopocera* (Dejean, 1835) |
| | | *Derobrachus geminatus* (LeConte 1853) |
| 11 | Chrysomelidae (Latreille, 1802) | *Callosobruchus maculates* (Fabricius, 1775) |
| | | *Callosobruchus chinensis* (Linn, 1758) |
| 12 | Curculionidae (Latreille, 1807) | *Sitophilus oryzae* (Linnaeus, 1763) |
| | | *Cosmopolites sordidus* (Germar,1824) |
| 13 | Cetoniidae (Leach, 1815) | *Cetonia aurata* (Linnaeus, 1758) |

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