International Journal of Entomology Research
www.entomologyjournals.com
ISSN: 2455-4758
Received: 26-11-2024, Accepted: 27-12-2024, Published: 12-01-2025
Volume 10, Issue 1, 2025, Page No. 171-174

Diversity of Buprestid beetles (Coleoptera: Buprestidae) in Jhunjhunu district of Rajasthan, India

Rajmohan Meena[1*], Vinod Kumari[2]
[1] Department of Zoology, Govt. College, Jayal, Nagaur, Rajasthan, India
[2] Department of Zoology, University of Rajasthan, Jaipur, Rajasthan, India

Abstract
This study focused on Jhunjhunu district, located in the semi-arid region of Rajasthan, with the goal of exploring the diversity of Coleopteran species and updating the knowledge of Buprestidae family diversity. Data collected from January 2021 to December 2022 revealed a total of six species of buprestid beetles, distributed across four subfamilies: Julodinae (3 species), Buprestinae (1 species), Agrilinae (1 species), and Chrysochroinae (1 species) in the study area. The present study aimed to document the diversity of Buprestid beetles, providing preliminary information on their potential beneficial and pest status in the study area.

Keywords: Semi-arid, Buprestidae, Diversity, Jhunjhunu

Introduction

Buprestidae, commonly known as "jewel beetles" or "metallic wood-boring beetles," is a large family of beetles, often characterized by their striking, metallic coloration. These beetles are primarily wood borers, with many species causing damage to trees, crops, and ornamental plants (Chandra and Gupta 2006) [10]. In India, the family Buprestidae is quite diverse, with various species distributed across different regions of the country. These beetles play important ecological roles as well as economic impacts (Timbavati, 2018) [11]. Hespenheide (1990) described a new species of Buprestidae from the Dominican Republic. The biology and geographic distribution of the Buprestidae in North America was discussed by Nelson and Macrae in 1990. Based on an estimated species of buprestid beetle, genus *Agrilus* is the largest of the family Buprestidae (Bellamy 1985; Blackwelder 1944 [3]; Fisher 1930) [4]. Lopez- Martinez *et al*., (2015) studied xylophagous buprestid beetles associated with common fig or Higuera (*Ficus carica*) in Marelos Mexico and three species of buprestid beetles were identified. Corona- Lopez *et al*., (2017) [6] studied diversity of 55 species of buprestid beetles associated with 14 genera under 4 subfamilies from Morelos, Mexico. A total of 10 buprestid species belonging to 4 subfamilies viz., Agrilinae, Buprestinae, Chrysochronae and Polycestinae were reported by Sheehan *et al*., (2019).

Materials and Methods

The study area, Jhunjhunu, is located in the northeastern part of Rajasthan, between latitudes 27°38' to 28°31' north and longitudes 75°02' to 76°06' east. It covers an approximate area of 5,926 square kilometers. The survey was conducted within Jhunjhunu and its surrounding regions, with monthly sampling throughout different seasons—summer, winter, and monsoon—over a period from January 2021 to December 2022. To ensure unbiased results, sampling sites were selected from various habitats within Jhunjhunu, avoiding any spatial or temporal biases. Sites were chosen randomly across all seasons. The study mainly focused on four primary sites, with additional sites visited for the collection of Buprestid beetle species.

Sampling for assessing the abundance and diversity of beetles in a given area was done once a month during both morning and evening hours throughout the entire study duration by following sampling techniques:

1. **Hand collection:** Collection by hand involved actively searching for the insects on the ground, within leaf litter, beneath tree barks or logs, in rotting deadwood and other substrates. The slow-moving coleopteran insects are collected by hand and placed in a container.

2. **Sweep net:** Sweep net was used for collecting beetles when they are in flight or at rest on flowers, leaves, or shrubs. Nets are made with an aluminium handle of 120 cm in length with a metal ring of 30 cm in diameter and net bag of about 80 cm. The sweeps were done in morning and evening hours while walking in the study sites. About hundred sweeps were taken randomly from each study site (Schauff, 1986) [8].

After collection, coleopteran insects were killed in the killing jar. After a field trip, a killing jar with coleopteran insects was stored in the freezer until it was time to mount the beetle. In general, large buprestid beetles were pinned with an entomological pin on a card material initially and then showcased in specimen wooden boxes.

Result

In this study a total of 6 species belonging to 4 genera under 4 subfamilies viz., Julodinae (3 species), Buprestinae (1 species), Agrilinae (1 species), and Chrysochroinae (1 species) of the family Buprestidae were recorded from January 2021 to December 2022 from four study sites selected in the Jhunjhunu district (Table 1). As evident from species richness and abundance of different subfamilies (Table 2), subfamily Julodinae was comprised of the highest number of species (3 species), followed by Buprestinae, Agrilinae and Chrysochroinae (1 species each) (Fig 1). As compared to number of individuals, again Julodinae was the most abundant subfamily (60.20% of the total individuals), followed by Buprestinae (5.86%), Agrilinae (3.06%) and Chrysochroinae (1.02%) (Fig 1).

Table 1: Species recorded in the study area of the family Buprestidae from January 2021 to December 2022.

Family	Subfamilies	Species
Buprestidae	Julodinae	*Sternocera chrysis*
		Sternocera basalis
		Sternocera laevigata
	Buprestinae	*Anthaxia* sp.
	Agrilinae	*Trachys minutus*
	Chrysochroinae	*Lampetis cupeosplendens*

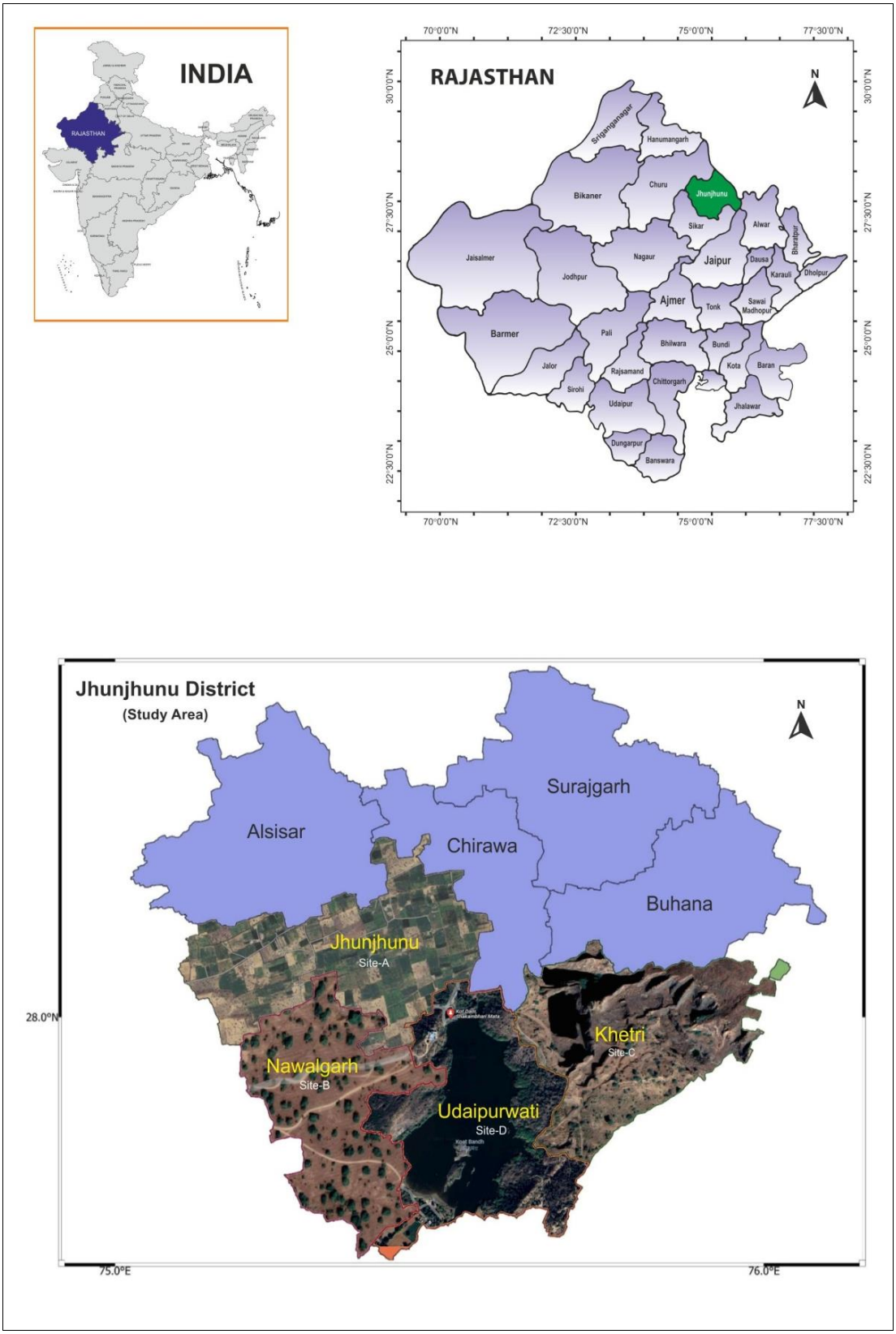

Photo Plate 1: Location of Jhunjhunu district with sampling sites

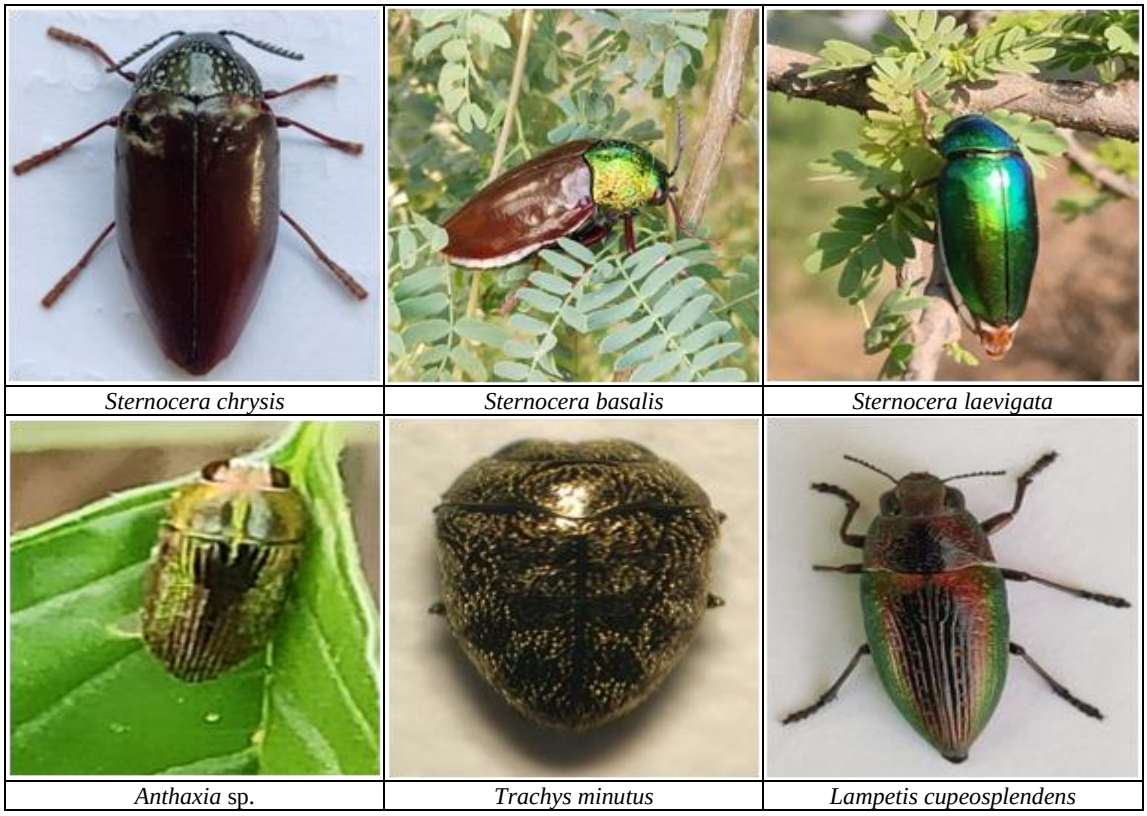

Photo Plate 2: Species recorded in the study area of the family Buprestidae from January 2021 to December 2022.

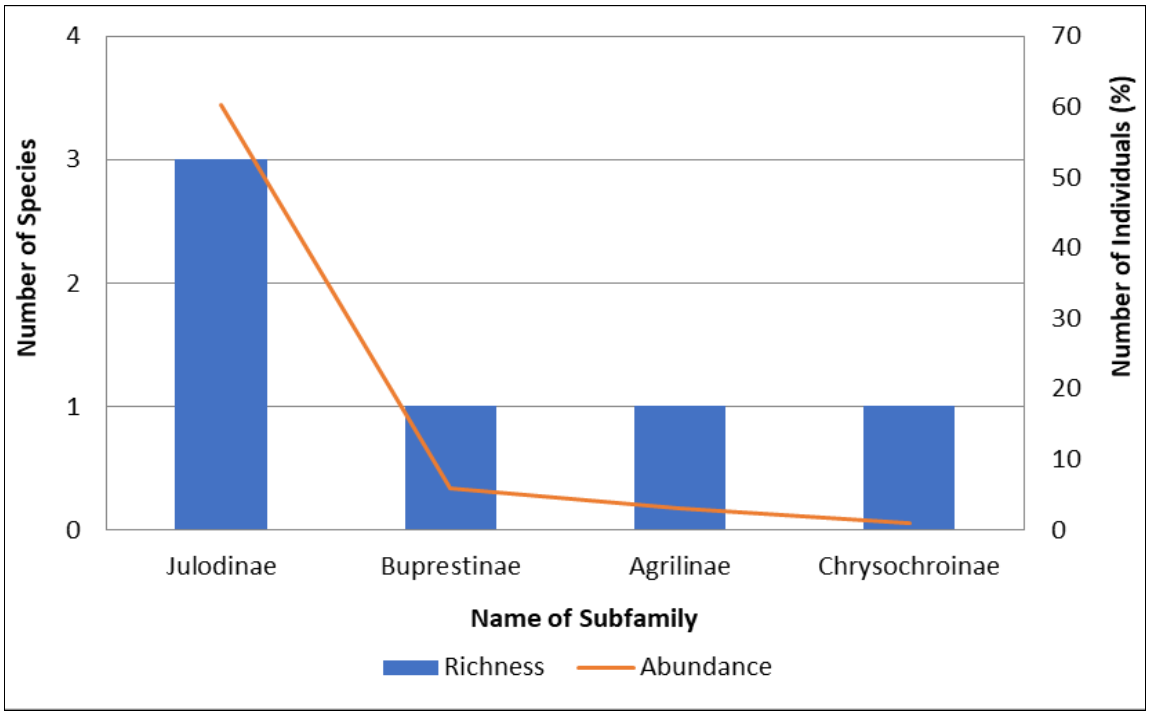

Fig 1: Species richness and abundance of Buprestidae family in the study area from January 2021 to December 2022.

During the first year of study, maximum number of species belonged to the subfamily Julodinae constituting 3 species, followed by Buprestinae and Agrilinae (1 species each) (Table 2). On the other hand, again maximum number of individuals belonged to the subfamily Julodinae which constituted 60.86% of the total individuals, followed by Buprestinae (28.26%) and Agrilinae (10.86%).

During the second year of study, maximum number of species belonged to the subfamily Julodinae constituting 2 species, followed by Buprestinae, Agrilinae and Chrysochroinae (1 species each) (Table 2). On the other hand, again maximum number of individuals belonged to the subfamily Julodinae which constituted 59.61% of the total individuals, followed by Buprestinae (19.23%), Agrilinae (13.46%) and Chrysochroinae (7.69%).

Table 2: Species richness and abundance of different subfamilies under the family Buprestidae recorded from the study area from January 2021 to December 2022.

Buprestidae	2021		2022		2021-22	
	Richness	Abundance	Richness	Abundance	Richness	Abundance
Julodinae	3	28	2	31	3	59
Buprestinae	1	13	1	10	1	23
Agrilinae	1	5	1	7	1	12
Chrysochroinae	0	0	1	4	1	4
Total	5	46	5	52	6	98

Discussion

The Buprestidae family, known as jewel beetles or metallic wood-boring beetles, is a diverse group of insects belonging to the order Coleoptera. With over 15,000 known species described worldwide (Bellamy *et al*., 2020) [9]. They are named for their striking metallic colours, resembling precious gemstones. As compared to previous studies on buprestid beetle diversity from various regions of World, the present study reported 6 species of buprestid beetles related to 4 genera under 4 subfamilies viz., Julodinae, Buprestinae, Agrilinae and Chrysochroinae from the Jhunjhunu district. Earlier, Hespenheide (1990) described a new species of Buprestidae from the Dominican Republic. The biology and geographic distribution of the Buprestidae in North America were also discussed by Nelson and Macrae in 1990. Based on estimated species of buprestid beetle genus *Agrilus* is the largest genus of the family Buprestidae (Bellamy, 1985 [2]; Blackwelder, 1944 [3]; Fisher, 1930) [4]. Similar to the present study, Lopez- Martinez *et al*., (2015) identified 3 species of buprestid beetle during the study of xylophagous buprestid beetles associated with common fig or Higuera (*Ficus carica*) in Marelos Mexico. Likewise, a total of 10 buprestid species belonging to 4 subfamilies viz., Agrilinae, Buprestinae, Chrysochronae and Polycestinae were reported by Sheehan *et al*., (2019) [7]. However, in contradiction to the present study, Corona- Lopez *et al*., (2017) [6] reported diversity of 55 species of buprestid beetles associated with 14 genera under 4 subfamilies from Morelos, Mexico.

Conclusion

Buprestid beetles play a critical ecological role in forests and other ecosystems through their activities as decomposers, prey, and pollinators (Dyar, 1929 [14]; Linsley, 1959 [15]; McCullough and Siegert, 2000 [16]; Schowalter, 2012). While some species can act as pests, particularly when they damage living trees or invade new regions, their broader role in nutrient cycling, decomposition, and as part of the food web is essential for ecosystem health (Poland and McCullough, 2006 [17]; Haack and Wiedenmann, 2007) [13]. Understanding these beetles' ecological roles helps in better forest management and conservation efforts.

References

1. Hespenhcide HA. New species of Buprestidae (Coleoptera) from the Dominican Republic. Proceedings of the Entomological Society of Washington,1990:92(3):400-406.
2. Bellamy CL. A catalogue of the higher taxa of the family Buprestidae (Coleoptera). Navorsinge van die Nasionale Museum, Bloemfontein,1985:4:406-472.
3. Blackwelder RE. Checklist of the coleopterous insects of Mexico, Central America, the West Indies, and South America, Part 2. United States National Museum, Bulletin,1944:185:189-341.
4. Fisher WS. New West Indian Buprestidae (Coleoptera). Proceedings of the Entomological Society of Washington,1930:32:125-129.
5. Lopez-Martinez V, Vargas OR, Alia-Tejacal I. Xylophagous beetles (Coleoptera: Buprestidae and Cerambycidae) from *Ficus carica* L. (Moraceae) in Morelos, Mexico. The Coleopterists Bulletin,2015:69(4):780-788.
6. Corona-Lopez AM, Reza-Perez EV, Toledo-Hernandez VH, Flores-Palacios A, MacRae TC, *et al*. Diversity of Buprestidae (Coleoptera) from El Limon de Cuauchichinola, Tepalcingo, Morelos, Mexico. The Pan-Pacific Entomologist,2017:93(2):71-83.
7. Sheehan TH, Ulyshen MD, Horn S, Hoebeke ER. Vertical and horizontal distribution of bark and woodboring beetles by feeding guild: is there an optimal trap location for detection. Journal of Pest Science,2019:92:327-341.
8. Schauff ME. Collection of beetles using a sweep net: Description of the method. Journal of Entomological Techniques,1986:15(2):112-118.
9. Bellamy CL, Nelson GH, Bellamy MS. A review of the world genera of Buprestidae (Coleoptera) (18th ed.). The Coleopterists' Society,2020:18:1-121.
10. Chandra S, Gupta P. Insect Pests of Forests and Forestry Management in India. Forest Research Institute, 2006.
11. Timbavati M. Economic and Ecological Importance of Buprestidae in the Indian Subcontinent. Journal of Entomological Studies,2018:45(2):88-101.
12. Kumar S, Singh R. Wood-Boring Insects in Indian Forests. Indian Journal of Forest Research,2015:9(4):21-29.
13. Haack RA, Wiedenmann RN. Buprestid beetles as forest pests. Forest Health Technology Enterprise Team (FHTET), United States Department of Agriculture, Forest Service, 2007.
14. Dyar HG. The life history and habits of certain buprestid beetles. Bulletin of the Brooklyn Entomological Society,1929:24(2):43-57.
15. Linsley EG. Beetles as pollinators. Annual Review of Entomology,1959:4:45-68.
16. McCullough DG, Siegert NW. Monitoring the health of North American forests using buprestid beetles. Forest Pathology,2000:30(2):109-121.
17. Poland TM, McCullough DG. Emerald ash borer: Invasion of the ash resource. In: McManus, M. L., & Gottschalk, K. W. (Eds.), Proceedings of the 20th USDA Interagency Research Forum on Invasive Species,2006:2006:54-55.
18. Schowalter TD. Insect Ecology: An Ecosystem Approach. Academic Press. (Provides insights into the general ecological roles of insects like Buprestids in forest ecosystems), 2012.