5. Some Common Coleopteran and Hymenopteran Insects from PDKV Premises in Akola

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Abstract

The insects have invaded almost all habitats. They are so abundant in their total number of species that they represent about 80% of the animal kingdom. In the present study, the biological diversity of Coleoptera families was studied in the study area and a survey was conducted at Dr. P. D. K. V. Akola to study the incidence and diversity of Coleopteran fauna from January to March 2023. In the study, the photographic collection and supporting information about PDKV Akola. Photographs are taken by smartphones using the Global Positioning System by Google. The insects were grouped into families based on their morphological characteristics using standard identification keys. The observed dissimilarity in community composition between Areas 1 and 4 could be due to variability & vegetation type. Family Carabaeidae is followed by Scarabaeidae beetles community composition in Areas 1 and 4 was richer than in Areas 2 and 3. The Carabaeidae beetle assemblage at PDKV was dominated and followed by the family Scarabaeidae then by Coccinelloidae and Staphylinidae with many rare species and few abundant species. The Coleoptera is highly observed in the college campus area. The Hymenopterans are highly observed in the college garden Area 1 and also near Area 4. They both are rarely found in Area 3 due to human interruption and road traffic. These insect's diversity creates the biological foundation for all terrestrial ecosystems and also as biological control in agricultural and forest crops.

Keywords: Biological diversity, Coleoptera, Hymenoptera, Abundant.

Introduction

The insects have invaded almost all habitats. They occur commonly everywhere and differ widely in their form structure and behavior about the mode of life they have adapted. They are so abundant that they represent about 80% of the animal kingdom. Till now about 7150000 species of living insects and 12000 species of fossil insects have been recorded and yet a large

number of species are to be discovered in the future. Due to these facts, the insect's taxonomy is a very exhaustive and ever-growing branch of technology.

Coleoptera is the largest order, not only in the Arthropods but in the entire animal kingdom, consisting of about 330000 species. The order represents heterogeneous assemblance of very minute size viz., about 0.5 mm long corylophids and ptillids and of large size i.e., about 155- 160 mm long beetles. Some are of economic importance and are entomophagous predators that are successfully used in the eradication of various pests. Coleoptera fauna of the soil has high abundance and diversity, being represented by organisms that respond quickly to environmental changes and can thus be used as an indicator of soil environmental quality.

The order Hymenoptera consists of more than 100,000 species and a large number of them are still undiscovered due to severe parasitic mode of life. They may be free-living, phytophagous, predatory, entomophagous parasitic, or social insects. Certain wasps, bees, and ants are polymorphic and social insects. Honey bees are the best natural pollinators and honey and wax producers. Chalcid, braconid, and ichneumonid flies are well-known parasites and are widely used in pest control management throughout the world. It also has recently been used as an indicator of biodiversity or landscape structure in ecological studies due to its high habitat requirements.

In the present study, the biological diversity of Coleoptera families was reported in the study area and a survey was conducted at Dr. P. D. K. V. Akola to study the incidence and diversity of Coleopteran and Hymenopteran fauna during January, February, and March 2023. Studies on diversity and distribution of fauna are prerequisites of biodiversity conservation. In the present study, an attempt has been made to enlist the Coleopteran diversity. To investigate the diversity of Hymenopterans and Coleopterans in the given area to assess the habitat preference of species in different vegetation types of agricultural ecosystems. They create the biological foundation for all terrestrial ecosystems. Some Coleopterans and Hymenopterans as biological control are important in agricultural and forest crops.

Material and Methods

Dr. Panjab Rao Deshmukh Krishi Vidyapeeth is the University of Agriculture located at Akola City in Vidarbha, Maharashtra, India which was established in 1969. PDKV occupied a 57-acre area with diverse flora and fauna. It lies in 20°42′N 77°00′E, with 285 m as latitude. In

the study, the survey was performed from 4 different areas of PDKV, Area 1, Area 2, Area 3, and Area 4.

In the study, the photographic collection and supporting information about PDKV Akola. Photographs are taken by smartphones using the Global Positioning System by Google. We also have successfully surveyed respective campuses where we have observed diversity in insects due to the different variety of crops existing thereon in abundance. This has been done in between January to March 2023. During this tenure, we used to visit PKDV in the evening and morning to capture insect photographs thrice a week. The Photographic Collection of Coleopteran and Hymenopteran majorly was done. The insects were grouped into families based on their morphological characteristics using identification keys provided by Borror *et al.*, (1989), Bingham (1897), and Morley (1913). Some online sources were also used for identification. Introduction to the Identification of Beetles (Coleoptera) P. M. Choate, 1999.

Observation and Result

In the present study, the survey was performed in the PDKV from 4 different areas, Area 1 (A1): College Garden (M2WF+4J7 garden), Area 2 (A2): College Campus (PKV MIDC phase 2), Area 3 (A3): campus B (Boys hostels) and Area 4 (A4): near entomology department (PDKV road). During the study, the diversity indices were calculated for families. Different indices are given in Tables 1 and 2, the results clearly showed that a total 4 families from the order Coleoptera, we reported, Scarabaeidae (2 genera), Carabaeidae (3 genera), Coccinelloidae (1 genera), Staphylinidae (1 genera) and in the order Hymenoptera we observed 3 families in which Sphecidae (2 genera), Apidae (2 genera), Formicidae (2 genera). The Coleoptera (Beetles) are highly observed in the college campus area and Hymenoptera (ants, bees, wasps) are highly observed in the college garden area and also near the entomology department area. They both are rarely found in the campus B area due to human interruption.

Table 1: Diversity of Coleopterans Recorded during the Months from January to March 2023

Sr. No.	Family Reported	Genera Reported	Area for Study			
			A 1	A 2	A 3	A 4
	Scarabaeidae	*Phyllophaga*	-	+	-	+
	Staphylinidae	*Paederus*	-	+	+	-
	Carabidae	*Platynus*	-	+	-	-
	Scarabaeidae	*Strategus*	+	+	-	-
	Carabidae	*Scarites*	-	-	+	-
	Tenebrionidae	*Opatrum*	-	+	+	-
	Carabidae	*Coreblemus*	-	+	-	-
	Coccinelloidae	*Coccinella*	+	-	-	+

Table 2: The Diversity of Hymenopterans Recorded during the Months from January to March 2023

Sr.No.	Family Reported	Genera Reported	Area for study			
			A 1	A 2	A 3	A 4
	Sphecidae	*Chalybion*	-	+	-	-
	Apidae	*Apis dorsata*	+	+	-	+
	Sphecidae	*Sphex pensylvanicus*	+	-	-	-
	Apidae	*Apis florea*	+	+	-	-
	Formicidae	*Camponotus herculeanus*	+	-	-	+
	Formicidae	*Camponotus*	+	-	+	-

Discussion

In the present study, the survey was performed in the PDKV from 4 different areas, and the diversity indices were calculated for families. Different indices are given in Tables 1 and 2. The results clearly showed that a total of 4 families from the order Coleoptera were reported, Scarabaeidae in abundance. Similar data was reported by Chandra and Uniyal (2007) which indicated that the diversity of the beetle fauna of the Kolkas region of Melghat Tiger Reserve was quite high (14 genera and 26 species). They recorded 94 species of scarab beetles belonging to 30 genera & 9 subfamilies from Madhya Pradesh recorded 9 pleuritic scarab beetles belonging to 4 subfamilies from Great Himalayan National Park, Himachal Pradesh, India. The beetle fauna in the present study were dominated by the subfamily Scarabaeidae which comprises 62.8 % of the total species, followed by the Melolonthinae (16.5%). Nurhariyanto *et al.*, (2008) also recorded similar findings.

In the present study, hymenopteran insects belong to 3 families, 6 genera. Order Hymenoptera, being a group of agriculturally important insects including its role as a bio-control agent in this region, demands biodiversity studies for understanding its distribution pattern, as formerly considered & the high species diversity. Similar results were reported in the study of many rare species indicating that the study area is a real paradise for Hymenoptera by P. Rajkumari *et al*; (2012). The beetle fauna was considered rich, with a wide variety of genera belonging to different families. The predominance of Scarabaeidae confirms the association of this family they respond rapidly to environmental changes, making them important indicators for monitoring ecosystems Silva *et al.* (2020) and Andrew B.T. Smith et.al ; (2017)

Conclusion

The observed dissimilarity in community composition between Areas 1 and 4 could be due to variability & vegetation type. Family Carabaeidae is followed by Scarabaeidae beetles community composition in Areas 1 and 4 was richer than in Areas 2 and 3. The Carabaeidae beetle assemblage at PDKV was dominated and followed by the family Scarabaeidae then by Coccinelloidae and Staphylinidae with many rare species and few abundant species. The Coleoptera (Beetles) is highly observed in the college campus area. The Hymenoptera (ants, bees, wasps) are highly observed in the college garden area i.e., in Area 1 and also near Area 4. They both are rarely found in Area 3 due to human interruption and road traffic.

Reference

- Alana Cristina Cunha Bernardes, Osmann Cid Conde Oliveira, Alves Silva Abundance and Diversity of beetles (Insecta: Coleoptera) in land use and management system. 2020; 44: 0190183.
- Bany Joy and Gigi Joseph A Comparative Study On The Hymenopteran Diversity With
- Bingham, CT. Ants and cuckoo wasps. The Fauna of British India including Ceylon and Burma. Hymenoptera II, Taylor and Francis, London, 1903; 1-506
- Bingham, CT. Wasps and Bees. The Fauna of British India including Ceylon and Burma. Hymenoptera I, Taylor and Francis, London, 1897; 1-413.
- Biodiversity of Coleoptera by Patrice Bouchard, Andrew B.T. Smith, Hume Douglas, Mathew L. Gimmel 2017 (pp. 337-417)
- Borror D J, Triplehorn CA, Jonson NF. An introduction to the study of Insects. Saunders College Publishing (6thEdition) 1989; 1(875):665-774.
- Chandra, K. and V.P. Uniyal, 2007. On a collection of pleuritic Scarabaeidae (Coleoptera) from the Great Himalayan National Park, Himachal Pradesh, India. Z OOS' Print J., 22(9): 2821-2823.
- Diversity and Distribution pattern of Hymenoptera Insect in Assam, India by P. Rajkumari, D. Sharma, A. Rahaman, P. Patgiri 2012.
- Introduction to the Identification of Beetles (Coleoptera) P. M. Choate, 1999.
- Morley C. Ichneumonidae. The Fauna of British India including Ceylon and Burma. Hymenoptera III, Taylor and Francis, London, 1913; 1-531.

- Nurhariyanto, L. Joshi and E. Martini, 2008. Dung beetles (Coleoptera: Scarabaeoidea) diversity: an indicator of animal diversity? World Agroforestry Centre- ICRAF, SEA Regional Office, Bogor, Indonesia.
- S M Dadmal & Suvarna Khadakkar Insect faunal diversity collected through the light trap at Akola vicinity of Maharashtra concerning Scarabaeidae of Coleoptera. JEZS 2014; 2 (2): 44-48.
- Special Reference to Ants In Thommankuth Forest And Adjacent Areas Of Idukki District In Western Ghats (2017).
- Subhi Bishnoi and Dr. Kusum Dang Diversity of some Hymenopteran Insect in Kota, Rajasthan India JEZS 2019; 7(2): 31-33 © 2019 JEZS.
- Text Book by Dr. D.B. Tembhare Modern Entomology ISO 9001: 2015.
- V.G. Thakare, V.S. Zade and K. Chandra (2011), Diversity and Abundance of Scarab Beetles (Coleoptera: Scarabaeidae) in Kolkas Region of Melghat Tiger Reserve (MTR), District Amravati, Maharashtra, India. World Journal of Zoology 6 (1): 73-79, ISSN 1817-3098.
- Veeramuthu Anbalagan, Michael Gabriel Paulraj, Savarimuthu Ignacimuthu (2015) *Diversity and abundance of Hymenoptera families in vegetable crops in north-eastern District of Tamil Nadu, India. International Journal of Fauna and Biological Studies; 2 (3): 100-104
- Vijaya V Bajad, DB Undirwale, S.V. Dhonde, S.M. Dadmal scarab beetles collected through the light trap at Akola vicinity of Maharashtra concerning Coleoptera. JEZS 2019; 7(2): 405-409.