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Dr. Bharat PandramAssistant Professor, UOA,
Department of Zoology,
Prayagraj, Uttar Pradesh, India**Amit Kumar Devaliya**Research Scholar, Holkar
Science College, Department of
Zoology, Indore, Madhya
Pradesh, India**Pooja Thakur**Faculty of G.S.C., Department of
Biotechnology, Jabalpur,
Madhya Pradesh, India**Ajay Singh Rajput**Assistant Professor, Department
of Biotech, St. Mary P.G. College
Vidisha, Madhya Pradesh, India**Corresponding Author:****Dr. Bharat Pandram**Assistant Professor, UOA,
Department of Zoology,
Prayagraj, Uttar Pradesh, India

First report of cuckoo bee in the Adamgarh Hills, Pahadiya, Hoshangabad, M.P.

Dr. Bharat Pandram, Amit Kumar Devaliya, Pooja Thakur and Ajay Singh Rajput

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Abstract

Cuckoo Bees have an economic interest and play an important role in ecosystems through pollination and as prey for other species. Narmadapuram is one of the most enriching and diverse areas for faunal diversity. The beauty of this place by the Adamgarh hills, which provides a natural habitat for many species, especially the Cuckoo Bee, and Diversity is one of the most abundant in this area due to the suitable and favorable environment for them. During the survey of Pahadia, Adamgarh hills, we observed the first time Cuckoo Bee in the area. It belongs to the Melectinilarge-sized apid bees. They are brood parasites of the related typical digger bees and occasionally visit flowers. As in other cuckoo bees, females can be easily distinguished from those of their hosts by the lack of scopae and other pollen-collecting adaptations. Their body hair is rather short and the abdomen lies flat against the exoskeleton.

Keywords: Adamgarh, cuckoo bees, Narmadapuram

Introduction

Kleptoparasitic behaviour shows by cuckoo bees, they do not construct nests and lay eggs in the other nests, usually showing social parasitism ^[2]. Adamgarh Hills, Narmadapuram is taxonomically one of the most enriched and diverse areas for the diversity of the fauna. The beauty of this place is the pleasant climatic conditions due to River Narmada and Tawa with the lush green hills around it, which provides a natural habitat for the species. The diversity of cuckoo bees is one of the most abundant in these areas due to the suitable and favourable environment for them. During the survey of Adamgarh hills, we observed different types of bee mud tunnels under the cave which other flies construct. The cuckoo bees constitute around fifteen percent of the bees present globally. In cuckoo bee some take over the nests of only a particular host species of bees, while others are known to invade roosting places of different species when the hosts die or are killed. Cuckoo bees are essential pollinators and cross-pollinate for a variety of flowers ^[2]. A survey was done for the study of the diversity in the Adamgarh hills.

These cuckoo bees are usually active from June to October, depending on the specific host species. Bees don't have pollen-carrying adaptations, as they do not need to provision nests. Adult bees feed on nectar from a variety of the flowers of a wide range of different nectar plants. These host-parasite relationships are quite complex. The larvae of *Coelioxys* species kill the host larvae with their strongly developed mandibles and feed on the host's pollen provisions. They spin a cocoon for 11-16 days. These species are usually univoltine, but a second generation is possible for some species ^[5].

Unlike their industrious relatives, such as honeybees and bumblebees, cuckoo bees have evolved a parasitic lifestyle, relying on other bee species to raise their young. These bees are named after the cuckoo bird, which is notorious for laying its eggs in the nests of other bird species.

Cuckoo bees belong to the family Apidae and are distributed worldwide, with over 800 known species documented so far. They are found in diverse habitats, ranging from forests to grasslands and even urban environments. Cuckoo bees have evolved various adaptations to exploit the nesting behavior of other bee species. These adaptations include morphological and behavioral traits that enable them to infiltrate and exploit host nests ^[6].

One of the key characteristics of cuckoo bees is their lack of pollen-carrying structures, such as pollen baskets or corbiculae, which are present in other bee species. Instead, cuckoo bees have specialized mouthparts adapted for nectar feeding. This adaptation allows them to conserve energy and focus solely on reproduction, as they do not need to collect pollen to provision their own nests [10]. Most of the times, Adamgarh caves are occupied by cuckoo bee.

After continuous observation of their behaviour, we get some clues about the pattern and the life cycle of cuckoo bees typically involves females seeking out the nests of other bee species. Once a suitable host nest is located, the female cuckoo bee will lay her eggs inside it. In most cases, the cuckoo bee eggs closely resemble the eggs of the host species, which helps to deceive the host bee into accepting them. After hatching, the cuckoo bee larvae eliminate or outcompete the host larvae, consuming the provisions meant for the host's offspring [2].

The study of cuckoo bees provides valuable insights into the co-evolutionary dynamics between parasites and their hosts, as well as the evolution of reproductive strategies. Understanding the intricate interactions between cuckoo bees and their host species has implications for pollination dynamics, community ecology, and conservation efforts [6].

In recent years, research on cuckoo bees has gained momentum, and scientists have made significant discoveries regarding their biology, behavior, and ecological roles and

interaction with the environment. By investigating the genetic relationships among different cuckoo bee species and their hosts, researchers have been able to shed light on the evolutionary history and diversification patterns within this unique group of bees.

In conclusion, cuckoo bees represent a captivating example of nature's diversity and complexity. Their parasitic lifestyle, specialized adaptations, and intricate interactions with other bee species make them an intriguing subject of study. Adamgarh hills always subject of curiosity due to variety of life. Further research on cuckoo bees will continue to enhance our understanding of their ecological roles, evolutionary relationships, and the broader implications for pollinator conservation.

Materials and Methods

- **Study area:** the survey was carried out in Adamgarh, Pahadiya (PPJM+2FQ), Narmadapuram, M.P.
- **Identification:** Photography is the method, which was used for the identification of the fields. Nikon Cool pics Digital camera was used for the photography. The random survey on Cuckoo bees was done from morning 8 am to 11 am, which is the suitable and appropriate time for the identification of Bees from the fields.

Observations

Table 1: Showing cave number and mud tunnel with Bee

S. N	Cave No.	Mud tunnel	Family: Genus	Total bee
1.	1	15	Apidae: Melectini	5
2.	3	26	Apidae: Melectini	13
3.	4	25	Apidae: Melectini	10
4.	5	20	Apidae: Melectini	8
5.	7	14	Apidae: Melectini	4
6.	8	23	Apidae: Melectini	15
7.	10	15	Apidae: Melectini	8
8.	11	18	Apidae: Melectini	14
9.	13	16	Apidae: Melectini	11

Result and Discussion

- After the survey, we observed that cuckoo bees are recorded from the Adamgarh hills, Narmadapuram and there is a total of 172 mud tunnels of 09 caves. Approx. 88 Individual bees recorded with the Melectini.
- Family Apidae: Melectini is the dominant group among others. Adamgarh Hills have many flowering plants as well as native plants, which are favourable habitats for the bees larva as a host plant and adult as a nectar plant. Ex-situ conservation always supported the diversity of any fauna and cuckoo bees are one of them. This is a component of the Nature's food web. The population of bees declining due to the loss of native hosts and nectar plants, but Adamgarh Hills is a healthy environment for them and always brings back their numbers.
- The index is a measure of diversity, which takes into account the number of species present, along with the relative abundance of each species. As species richness and evenness increase, so does diversity increases.

Conclusion

Present study reveals that the historic site of Adamgarh hill of Narmadapuram is rich with habitat in context of cuckoo bees which are the crucial pollinators of different plant species. This study also exhibits the kleptoparasitic behaviour of the cuckoo bee.

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Conflict of Interest

The authors do not have any kind of conflict of interest.



Fig 1: Showing cave no. 03, Adam Gark hills, Narmadapuram



Fig 2: Showing tunnel with Cuckoo bee, Adam Garh hills, Narmadapuram



Fig 3 & 4: Kleptoparasitic behaviour shows by Cuckoo bees

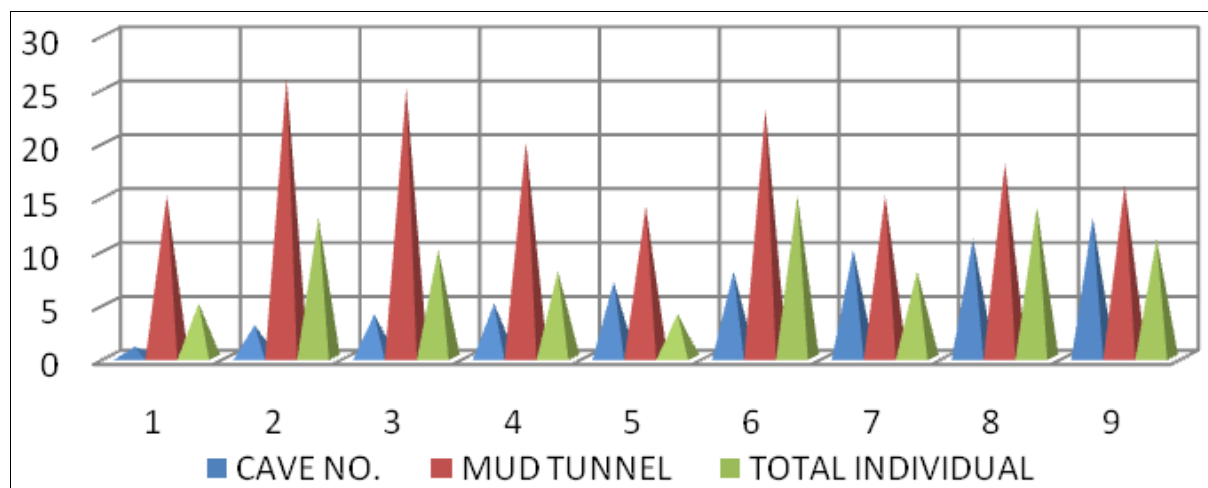


Fig 3: Chart showing number of individuals of bee and mud tunnels at study site

References

1. Abitha J, Rajmohana K, Bijoy C, Aswathi PG, Kumar PG. First record of cuckoo wasp *Trichrysis imperiosa* (Smith) (Hymenoptera: Chrysididae) from the nest of *Sceliphron coromandelicum* (Lepeletier) (Hymenoptera: Sphecidae) in India. *Entomon.* 2022;47(4):437-442.
2. Bogusch P. *Epeolus ladakhensis* sp. nov.: A new species of cuckoo bee from India. *Oriental insects.* 2020;54(2):265-272.
3. Dahan F, Alwabel A. Artificial Bee Colony with Cuckoo Search for Solving Service Composition. *Intelligent Automation & Soft Computing*, 2023, 35(3).
4. Ghosh D, Girish Kumar P, Subramanian KA. A rare Kleptoparasitic Bee *Tetralonioidella himalayana* (Bingham, 1897) (Hymenoptera: Apidae) from India: review and new data. *National Academy Science Letters*,

- 2023, 1-6.
5. Gibbs J, Ascher JS, Rightmyer MG, Isaacs R. The bees of Michigan (Hymenoptera: Apoidea: Anthophila), with notes on distribution, taxonomy, pollination, and natural history. *Zootaxa*. 2017;4352(1):1-160.
 6. Lhomme P, Hines HM. Ecology and evolution of cuckoo bumble bees. *Annals of the Entomological Society of America*. 2019;112(3):122-140.
 7. Lim K, Lee S, Orr M, Lee S. Harrison's rule corroborated for the body size of cleptoparasitic cuckoo bees (Hymenoptera: Apidae: Nomadinae) and their hosts. *Scientific Reports*. 2022;12(1):10984.
 8. Prakash AS, Jobiraj T, Bijoy C. A new species of cuckoo bee genus *Thyreus* (Hymenoptera: Apoidea: Apidae) from India with a revised key to Indian species. *Oriental Insects*, 2023, 1-9.
 9. Rosa P, Aswathi PG, Wiśniowski B, Bijoy C. Preliminary revision of the Indian cuckoo wasp genera *Trichrysis* Lichtenstein, 1876 and *Chrysidea* Bischoff, 1910, with description of a new species (Hymenoptera, Chrysididae). *European Journal of Taxonomy*. 2022;852:117-143.
 10. Wojcik V. Pollinators: Their evolution, ecology, management, and conservation. *Arthropods: Are They Beneficial for Mankind*, 2021, 1-22.