

Contribution of museums, census, mapping, high resolution photographs and audio-recording to the extinction of endangered species

Kavita Taneja and *Geetanjali Dhawan

Department of Zoology, D.B.G. Government College, Panipat-132103

*Department of Zoology, Arya P.G College, Panipat-132103

Abstract- To cope with extinction crisis, museums have a crucial role to play in preserving the life of every possible individual. Museum collections provide essential verifiable evidence of species occurrence over time and space and thus permit rigorous taxonomic, biological and ecological investigations. Two of the basic tasks required for census are gathering data on presence and abundance. By placing stickers on the wing of insect with identification information, migration patterns of insect including how far and where they fly is studied. Using mapping and visualization tools, endangered species and their vital habitats are protected. A new computer technology i.e. remote monitoring of wildlife sounds is used to listen multiple bird sounds. Thus, sound changes due to habitat loss or climate change is significant in the present study.

Index Terms- Museum, Photographs, Remote monitoring of wildlife sounds, Endangered species, Census

I. INTRODUCTION

Since time immemorial, it has been a necessary evil for natural history to kill animals (Wheeler,2014). This can, and does, contribute to the extinction of endangered species. To overcome this problem, museums are to be promoted to provide a critical foundation of taxonomy, evolutionary biology, biodiversity research and conservation biology. There are about 1,27,000 species of moths from all over the world (Alfred,1998) and of these, over 5000 species are reported from India (Cotes et.al.,1887-1889). Being largest faunal group play a very important role as agricultural pests (Sharma, 2011), night pollinators (Le Croy et. al., 2013) and indicators of ecological health (Holloway, 1985). As form a major component of the biodiversity of any area, so documentation of this group is indispensable to any scientific study and conservation program. In this light trap, potato trap and fixed time collection methods are used .Via mapping and visualization tool, vital of many invertebrates are protected. Remote sensing of bird sounds helped us to detect sound changes due to habitat loss or climate change .Thus, in present scenario, it has been tried to cope up with this worldwide problem by little and simple efforts.

Why endangered species?

Although conservation status by IUCN red list category states many animal species which belong to threatened and lower

risk but in the present study the endangered species have been categorised as very likely to become extinct.

Why so many techniques are studied?

Because of simplicity of these techniques one or two are not enough to combat this worldwide problem. In certain instances, an admixture of two or three are required to justify specific goal.

What is extinction?

The moment of extinction is generally considered to be the death of the last individual of the species, although the capacity to breed and recover may have been lost before this point.

Museums: Role in extincting fauna

A lot of research along with museums relies on the collection of wild specimens. It all sounds perfectly reasonable except that almost any taxonomist, ecologist or evolutionary biologist who uses natural history collections for research knows that such solutions would limit the work they could do. Thus, collecting animals for reference and study contribute to the extinction of endangered species.

How museums play role in conservation?

Museums only had dead stuff because our goal is to share our passion for these beautiful, often misunderstood creatures and draw out the deep and meaningful connections that can be made between our life and theirs. This can introduce ours to the earliest vertebrates on land, the foundation of the food chain and some of the dinosaurs closest cousins.

Traditionally, collecting what scientists call a voucher specimen is considered the gold standard for documenting the presence of a species. These are verifiable and permanent records as they preserve as much of the physical remains of an organism as possible (Glans,1993). Traditional voucher specimen include taxidermied study skins, cleaned skeletal material and spirit specimens.

MATERIALS AND METHOD

The present study was conducted on village Nawadha Aar located in Sanauli Khurd Block of Panipat District in Haryana, covering a stretch of approximately 1 Km from residential area to crop fields. From May 2014 to April 2016 following opportunistic search, light trap and fixed time, this study was continued. Opportunistic search was carried out in all possible microhabitats i.e. tree bark, leaves, bushes, herbs/shurbs, ceiling/

wall/ floor of houses, on grounds and under street light poles during evening hours of day (6-9 pm). Light trap was also set during the same time period using 160W mercury vapour bulb over a 3x3m² white cloth sheet which was hung between two vertical poles. The moth sitting on the white cloth was picked into the killing bottles containing chloroform. Later they were stretched properly using entomological pins and have been kept properly in the insect box for later identification.

Results and discussion

During the study 11 species of moth fauna belonging to lepidoptera were recorded from the study area. Lepidopterans

previously reported from this region remained unnoticed and the reason may be that limited area was covered during the study. Similar species reported from Delhi near Dwarka, janakpuri (Paul et. al.,2016) which revealed that among the heteroceran species so far reported from Delhi, 19 species belonging to 17 genera and 6 families are potential agricultural pests of common vegetables and crops of this region. Its highly encouraging to record lepidopteran diversity from this region for the first time. We expect many more species from the area in future through systematic survey species diversity as well as seasonal variations in moth abundance in this region



(A)



(B)



(C)



(D)



(E)



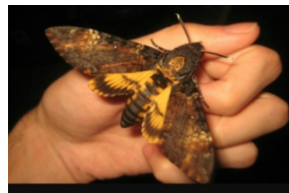
(F)



(G)



(H)



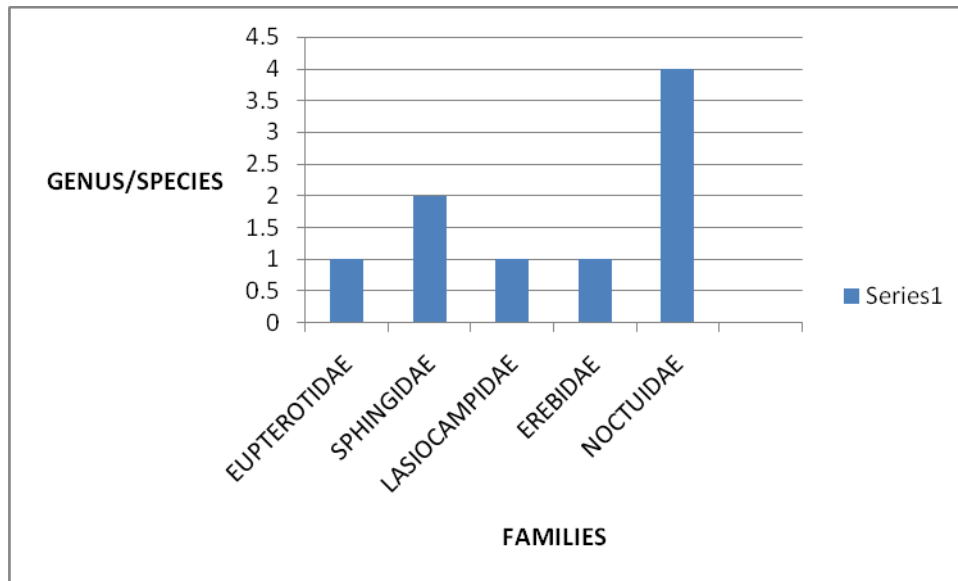
(I)

- A-*Spodoptera exigua*
- B-*Spodoptera litura*
- C-*Helicoverpa armigra*
- D-*Trabala vishnou*
- E-*Agrotis ipsilon*

- F-*Ophiusa triphaenoides*
- G-*Eupterote fabia*
- H-*Theretra oldenlandiae*
- I- *Acherontia styx*

Genus	Common name	Family	Wingspan	Microhabitat
<i>Acherontia styx</i> (Westwood,1887)	Deaths –head hawk moth	Sphingidae	104	Light trap
<i>Agrotis ipsilon</i> (Hufnagel,1766)	Dark sword grass moth	Noctuidae	47-50	Light trap
<i>Eupterote fabia</i> (Cramer,1779)	Monkey moth	Eupterotidae	84	House ceiling
<i>Helicoverpa armigra</i> (Hubner,1809)	Cotton bollworm moth	Noctuidae	35-37	House wall
<i>Ophiusa triphaenoides</i> (Walker,1858)	-	Erebidae	33-41	Grass
<i>Spodoptera litura</i> (Fabricius,1775)	Oriental leafworm moth	Noctuidae	35	Shrub
<i>Spodoptera exiguae</i> (Hubner,1808)	Beet armyworm	Noctuidae	27-30	Light trap

	moth			
<i>Theretra oldenlandiae</i> (Fabricius,1775)	Impatiens hawk moth	Sphingidae	61-70	Light trap
<i>Trabala vishnou</i> (Lefebvre,1827)	-	Lasiocampidae	50	Light trap



Mapping :What does it mean?

It was not so long ago that tracking wild animals meant slogging through the forest with a clipboard and binoculars, hoping for a glimpse of an animal or at least a pile of poo. But in recent years, technology has made it possible to track animal movements from a far in more and more detail, whether its albatrosses circling Antarctica, loggerhead turtles migrating across the atlantic or African elephants trying to navigate a landscape increasingly interrupted by human settlements.

Geographer James Cheshire and designer Oliver Uberti (former of national geographic) have dipped into this deluge of data to create 50 beautiful and engaging maps that reveal the wandering of animals captured by satellites, camera traps, drones and other tools. The result is their latest book, “where the animals go” (Miller,2016)

There are many types of indigenous measures to track Nilgai (Meena et.al.2014) such as physical presence of Nilgai in crop fields, use of shinning tapes like video or audio tapes, use of effigy models and scarecrows, live fencing ,use of beating bell.

Nilgai has virtually no Protected Area Status, so there is only a negligible natural habitat left for it. The plantations used by Nilgai as a daytime refuge is only single standing trees. And these areas do not provide much food for the Nilgai except leaves, seeds and fruits of *Acacia tortilis*, *A. nilotica* and in addition, Doob grass, *Cyanodon* sp. . So, a comprehensive strategy is required to conserve and manage the flora and fauna of Nawadha-Aar with the participation of local communities.

How high resolution photographs can contribute to conservation?

Conservation and photography appear as two distinct fields, but their combined impact can be profound. According to the acclaimed photographer, Joel Sartore, conservation

photograph shows the same thing, but with a bulldozer coming at it in the background.

Conservation photographs fall into two broad categories, both of which are equally valuable: 1.The snapshot: Upon seeing a striking scene one pulls out a cell phone or point-and-shoot camera, and snaps some quick framed pictures without expanding too much time or effort.2.The carefully crafted image: one sees the same scene, but instead of quickly shooting it and moving on, they take a series of skillfully crafted ,high quality images that tell the story in a more powerful way.

Dramatic framing enhances the influence of a picture.

Some subjects of conservation photography include:

- Destruction/conservation activity inside a protected area
- Habitat fragmentation, ranging from individual tree felling to land clearing for a large hydroelectric project
- Road kills
- Evidence of poaching / hunting such as empty gun shells, snares, jaw traps, skinned carcasses etc.

Thus, in order to create an impact conservation pictures should be put to work for specific causes.

II. A BENEFICIAL WEAPON FOR HABITAT AND SPECIES CONSERVATION – REMOTE SENSING

Remote sensing was used in 2009 to identify potential corridors that isolated tiger population could use to travel and connect with each other. A study published in 2012 used remote sensing to locate potential new habitats for critically endangered Cross River Gorillas, which need safe territory in which to bred and expand their numbers. The present study reveals that Nilgai occur in relatively open areas with undulating or flat terrain, avoiding dense forests and preferring scrublands, with low tree

and shrub densities. They are reported to tolerate scarcity of water (Chauhan et. al.,1990)

A future ehabitat will provide tools related to connectivity because connecting two or more habitats allows different, otherwise isolated populations of a species to interact, breed and exchange genetic material, preventing a species from becoming inbred. A new computer technology i.e. remote monitoring of wildlife sounds can listen to multiple bird sounds and sound changes when there is some sort of habitat loss or climate change.

III. CONCLUSION

After reading, researching and investigating, it is the time to focus on the power of small contribution. To add, if only a drop, of positive momentum to the conservation movements and efforts that have managed to successfully save species all over the world. By constantly applying pressure in the right places and by making examples of the **SAVED** we can keep moving forward in this fight. With the help of unrelenting conservation efforts (driven and maintained by your support and contributions no matter how big or small) various species have been brought back from the brink worldwide.

ACKNOWLEDGEMENT

My sincere thanks to Dr. Geetanjali Dhawan for identifying the moth species collected, editing and organising the material. And also of my husband Mr Kamal Taneja for proving me favourable environment to collect material, typing and photography.

REFERENCES

- [1] Gans C.1993.How many snakes need we catch and how many frogs? And, where belong our pickled turtles? Thoughts on environmental

protection.Pp.359-362 in "Herpetology in Australia: A Diverse Discipline" ed. by D. Lunney and D. Ayres. Royal Zoological Society of New South Wales Massaman.

- [2] Paul M., Das S.K., Singh R., Shashank PR, 2016. Journal of Entomology and Zoology Studies, Moth (Lepidoptera:Heterocera) Fauna of Delhi with Notes on Their role as Potential Agricultural Pests 4(2):435-438
- [3] Miller G.,2016.National Geographic, These Beautiful Maps Reveal the Secret Lives of Animals or news.nationalgeographic.com/2016/11/where-animals-go-tracking maps/
- [4] Wheeler T., 2014. New Scientist advertisement. Killing animals is a necessary evil for natural history
- [5] Meena RP., Meena BL.,Nandal U., Meena CL., Indigenous measures developed by farmers to curb the menance of blue bull (*Boselaphous tragocamelus*) in district Rajasmans, Rajasthan, India. Indian Journal of Traditional Knowledge,2014;13(1):208-215.
- [6] Alfred JRB, Das AK. Faunal Diversity in India, ENVIS Centre Zoological Survey of India, Kolkata, India, 1998, 311-318.
- [7] Cotes EC, Swinhoe C. Catalogue of Moths of India, Part i-vii, Indian Museum Calcutta, Kolkata, 1887-1889,1-815.
- [8] Holloway JD. Moths as indicator organisms for categorising rain forest and monitoring changes and regenerating processes. In: Chadwick, A.C. and Sutton, S.L. (Eds), Tropical Rain Forest, The Leeds Symposium, Special Publication, Leeds Philosophical and Literary Society, 1985, 235-242.
- [9] Le Croy KA, Shew HW, Van Zandt PA. Pollen presence on nocturnal moths in the Keton Dolomite glades of Bibb County, Alabama. Southern Lepidopterists News 2013;35:136-142.
- [10] Sharma G. Studies on Lepidopterous insects associated with vegetables in Aravali Range, Rajasthan, India . Biological Forum,2011;3(1):21-26.
- [11] Chauhan N.P.S.,Singh R. Proceedings of the Fourteenth Vertebrate Pest Conference 1990. Crop damage by overabundant populations of Nilgai and Blackbuck in Haryana (India) and its management,3-6-1990.

AUTHORS

First Author – Kavita Taneja , Department of Zoology, D.B.G.Government College, Panipat-132103, geetanjali_dhawan@yahoo.co.in

Second Author – Geetanjali Dhawan, Department of Zoology, Arya P.G College, Panipat-132103, dhingrakavi123@gmail.com