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A Critical Study of Relationships of Predators and Parasitic Infections in Wildlife Animals

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Abstract - Due to environmental change, there is less food available, putting wildlife in peril. The majority of big mammals change their eating habits to accommodate their physiological and reproductive requirements, and when a desired food source is scarce, the animals are more prone to disease. These animals sometimes leave their natural habitat in quest of food, invade neighboring environments, and occasionally come into touch with ill household animals. Additionally, they could start consuming anything that is put in front of them, which might be deadly. Living a parasitic lifestyle involves a wide range of various factors. Bencounter filters & Bcompatibility filters are part of Combes' complete theory of Bfilters, which explains the basics governing the development of host-parasite cohabitation.

Keywords - Parasitic lifestyle, Host-parasite, Predators and parasitic, Relationships.

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INTRODUCTION

The variety of carnivorous mammals found in India is unparalleled by any other region. India barely accounts for 2.2% of the world's geographical area, yet it is home to 55 (24%) of the world's 231 known carnivore species. There are eight large predators among these carnivores, which are animals that subsist largely on hunting large prey like ungulates and primates. These include the tiger, lion leopard, snow leopard, cheetah, wolf, and dhole. The country's varied topography has also resulted in the development of a number of diverse mammalian assemblages, each of which is home to its own unique set of huge predators and the food they rely on.[1]

Communities Of Prey And Predators

Recently, Devised a categorization scheme for India that divides the country into 10 biogeographic zones, each of which is further subdivided into biotic provinces. Prey species, such as ungulates and primates, and the predators that seek them out are distributed differently among the eight terrestrial biogeographic zones. Recent extinctions caused by humans have wiped off species from several communities.[2-4]

Preserving Indian Mammal Species

To wildlife, ecosystems, and habitat biodiversity, conserving mammals, especially the flagship species, is like saving the world.[5]

There isn't much room in the mammal world for big creatures like elephants and giraffes. This may be seen in a crude classification of animal groups into those with "little" and those with "big" bodied members. The chiroptera (bats) are the most numerous of the "small-bodied" mammal groupings with more over 100 species distributed over 7 families. A majority (over 50%) of India's animal population consists of bats and rats. The remaining Logomorpha Scandentia and Pholidota primates are insect eaters.[6-8]

There are tiny cats like the leopard cat and the rusty spotted cat among the felids; foxes, jackals, and other canids; and the mouse deer among the Artiodactyla. Carnivora, including felids, canids, and so on, are among the largest of the animal orders. There is just one member of each family in the orders Artiodactyla, Cetaceae, Perissodactyla, Sirenia, and Proboscidae. The proportion of large-bodied animals is estimated to be about 25%. [9]

One of the most well-known threats to India's mammal population is the international trafficking in wildlife. Animals like tigers, rhinoceroses, desert foxes, and others come to mind when one thinks about trade. Nonetheless, members of almost all mammalian groups in India may be found in trade. Although trade is likely a major contributor to their reduction, it is not the main explanation. Loss of habitat and interference from humans are two other factors that threaten animal populations.[10]

A plethora of research over the last two decades have shed light on the ecology of bigger mammals in Asia, revealing previously unknown information on

population dynamics, life histories, prey-predator relations, and patterns of habitat usage in the examined environments. These experiments have only been conducted in dense, well-lit, deciduous or scrub forest.[11]

The biggest challenge to the preservation of wild cats is the widespread deterioration of habitat caused by the increasing human population. Long-term protection of big cats in troubled and poor places is impossible. The leopard, however, seems to be an exception to this rule, since it may be seen living in or near human settlements, agricultural regions, and even cities. The number and distribution of wild tigers in Maharashtra outside of protected areas have been analysed.[12-13]

Difficulties In Parasitological Research On Wild Mammals

The diversity of mammalian hosts is a significant challenge to the characterization and systematisation of parasitofauna in the wild. Because of their rarity or protective status, many species are difficult, if not impossible, to acquire study material from. Parasites and their gene sequences are also poorly understood. Parasite species of specific wild hosts is an important variable in many investigations of parasitic illnesses of animals in the wild. Studies generally depend on identification of embryonated eggs in mammalian faeces because of the scarcity of wild animal corpses, particularly of protected species. However, this approach has several drawbacks, such as the fact that parasite eggs only shed at certain times of the year and are difficult to correctly identify. If we want accurate and trustworthy findings, we need to develop and deploy molecular methodologies for identifying species. In particular, there is a scarcity of high-quality information on mammalian parasite species in open-source databases.[14]

Further, there are a number of challenges inherent in studying parasites in wild animals. First, developments in parasite isolation & identification methods make it challenging to draw parallels between historical and modern studies. Further, it might be difficult to interpret data and compare them across populations, localizations, or habitats of the same species of wild animals due to individual variances associated with coinfection with other infections, food availability, age, breeding status, etc. Because certain parasite species reside mostly in the stomachs of their hosts, parasitological analysis may be skewed when uncommon and distinctive material from wild animals is utilised for other sorts of investigations. Understanding parasite infections in wild populations requires extensive investigations that account for these constraints. This review addresses several of these issues, which will perhaps aid in the organisation of future studies on parasitology in wildlife.[15-16]

MATERIAL AND METHODS

Herbivore faeces, carnivore faeces, omnivore faeces, and primate faeces were collected from the wild at Ramgarh Visdhari Tiger Reserve. The time frame for data gathering is from October 2018 to January 2021. Researchers examined 457 faeces samples from various animals to look for signs of parasites and other unprocessed material.

Carnivores Panthera tigris, Panthera pardus, Cuon alpinus, Felis chaus, Melursus ursinus, Hystrix indica, Paguma larvata, Hyaena hyaena, and Hystrix indica are among of the most common species that are kept as pets (Hyaena). The herbivores studied included the Bos gaurus (Indian bison), Boselaphus tragocamelus , Cervus unicolor, Axis axis Muntiacus muntjac , Tetracerus quadricornis , Lepus nigricollis Parasite tests were performed on all of these animals.

Wild animals, both carnivores and herbivores, had their faeces sampled throughout the research or fieldwork periods so their diets could be analysed. The collection of the faeces samples was aided by forest rangers. The faeces specimens were taken in plastic bags. samples were analysed best when they were freshly taken. Date, time, location, and the species of the animal from which the faeces came were all written on the polythene bags holding the samples. After double-bagging and triple-sealing, the samples were transported to the lab. There is a visual representation of the size and form of faeces pellets

RESULT
Sambar:-

Inches: 3–5. Proximal area is narrow, middle area is large, and distal area is narrowing. Center diameter of 180 d. Hair begins as an almost pure white color towards the proximal area and fades to a yellowish grey near the middle region. The further end is completely black.

Microscopic Form:

The edges are smooth where the two regions meet in the proximal part. The scales are imbricate and crenate in the middle, and distally they become spiky. The proximal and midsections of the medulla have a reticular polygonal look. No medulla can be seen at this distance. Mosaic design of shield is printed or imprinted on slide.

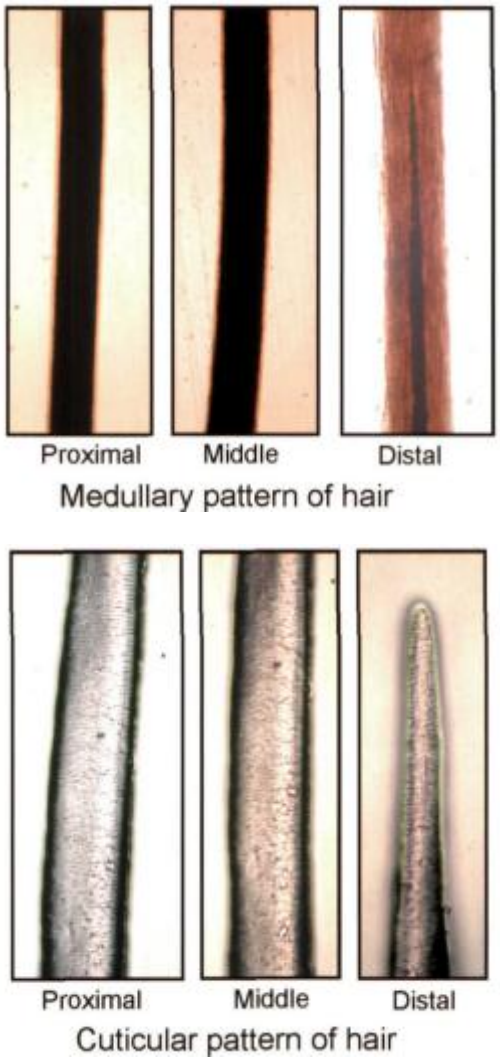

Figure 1 Cervus unicolor (Sambar)

Barking deer *(Muntiacus mun jac):-*

Inches: 1.30 to 1.80 Starting out narrow at the proximal end, the distal end gradually widens before narrowing again. When taken at the proximal end, they register at a 70d. The hair is a pale brown in the proximal area and fades to a light brown in the apical one.

Microscopic Form:

Scales intertwine and have a smooth border close to the body. The scales in the middle are intertwined and serrated. The distal end seems to have a spiky tip. The medulla is unbroken in the head and midbrain but breaks apart in the lower spinal column. Printing or imprint on slide shows Shield with a mosaic design.

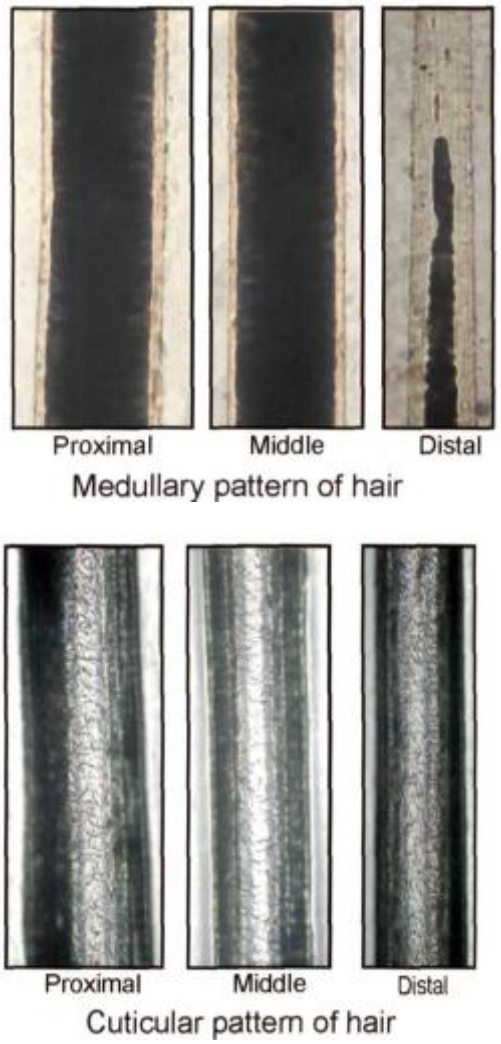

Figure 2 Muntiacus muntjac (Barking deer)

Microscopical examination of all scats was performed to determine the feeding plants from of the undigested epidermal remnants found in the feces samples collected from 279 herbivores throughout the course of the research period. Microscopical and on-the-ground observations were used to compile the inventory of plant species. Tables through and plates show the findings.

Sambar (Cervus unicolor) pellet samples from Ramgarh indicated that the animals eat 46 different kinds of plants, including grasses. Topica, Sorghum, and Cymbopogon were the most popular choices.

It was shown that Muntiacus used 36 distinct plant species throughout the research period, with a strong predilection for Cymbopogon & Heteropogon.

Table : 1 Percentage occurrence of undigested remains recorded In the scats of leopard from Ramgarh Tiger reserve

S. no	Prey species	No. of animals	% of occurrence	Animal weight considered	Biomass Kg	% Biomass
1	Cervus unicolor (Samber)	45	23.68	225	10125	42.61
2	Macaca mulatta	01	0.53	12	12	0.05
	Total	46			10237	

Table : 2 Percentage occurrence of undigested remains recorded in the scats of the Wild dog (Cuon alpinus) from Ramgarh Tiger reserve.

S. no	Prey species	No. of animals	% of occurrence	Animal weight considered	Biomass Kg	% Biomass
1	Cervus unicolor (Samber)	15	42.86	225	3375	78.36
2	Macaca mulatta	01	0.54	17	10	0.03
	Total	17			3385	

Table : 3 The frequency of occurrence of various food items of Cervus from Ramgarh Tiger Reserve.

S.No	Food plant eaten	% Frequency
1	*Heteropogon* contorfus	1.5
2	*Apluda mutica Sehima sulcatum*	1.9
3	*Heteropogon* contorfus	1.8
4	Sorghum contraversum	5.5
5	Pennisetum pedicellatum	1.7
6	Themada quadrivalvis	19.4
7	Pseudanthistiria hispida	1.0
8	Capillipedium huegell	2.1
9	Chloris dolichostachya	1.5
10	Paspalidium flavidium	0.7
11	Brachiaria ramosa	1.2
12	Hackelochloa granulan	1.1
13	Lantana camara	0.9
14	Panicum tripheron	1.5
15	Cymbopogon martini	8.8
16	Opiismenus burmanni	1.3
17	Sorghum decannense	6.0
18	Sorghum verticilliflorum	5.1

19	Spodiopogon rhizophoru	1.0
20	Adiantum incisum	1.0
21	Curculigo pseudomontana	2.1
22	Arisaema murrayei	1.1
23	Cyanotis fasciculate	1.7
24	Alysicarpus buplurifolius	2.5
25	Alysicarpus scariosus	1.1
26	Justicia simplex	1.7
27	*Clitoria biflora*	2.5
28	*Crotalaria linifolia*	1.1
29	*Desmodium*	1.5
30	*Indigofera astragalina*	1.5
31	*Indigofera linifolia*	2.1
32	*Cassia tora*	2.1
33	*Cltoria bifolia*	1.3
34	*Túdax procumbens*	0.7
35	*Hemidesmus indicus*	1.8
36	*Trichodesma indicum*	0.9
37	Hemigraphis latebrose	1.5
38	*Urena* lobafa	1.0
39	*Desmodiurn gangeticum*	0.6
40	*Argemone maxicana*	0.1
41	*Cynodon dactylon*	0.9
42	*Hybanthus* emeaspermus	1.1
43	*Hibiscus ovalifolia*	2.1
44	*Dechasohis* fia *malvus*	1.1
45	*Tephrosia puipurea*	1.5
46	*Tephrosia* hirta	1.9

Most preferred plants = Themada quadrivalvis (Frequency -19.4)

Cymbopogon martini (Frequency - 8.8)

Sorghum decannense (Frequency - 6.0)

Table: 4 The percent frequency occurrence of various food Items of Muntiacus muntjac (Barking deer) from Ramgarh Tiger Reserve.

S.No	Food plant eaten	% Frequency
1	Sorghum decannense	5.2
2	Sorghum verticilliflorum	5.4
3	Spodiopogon rhizophorus	2.0
4	Adiantum incisum	1.2
5	Curculigo pseudomontana	0.8
6	Arisaema murrayei	1.5
7	Cyanotis fasciculate	1.9
@	The mdda quadrivalvis	0.9
g	Sida sp"p	1.1
0	Sorghum contraversum	4.5
11	Pennisetum pedicellatum	3.2
12	Brachiaria ramosa	2.8
13	Gr"evva hirsuta	2.1
14	Dendrocalamus strictus	1.9
15	Cynodon dactylon	2.9
16	Heteropogon contortus	10.9
17	Cymbopogon flexureus	15.5
18	Justicia simplex	1.2
19	Solanum sp.	4.1
20	Tephrosia purpurea	3.1

21	Tephrosia hirta	2.8
22	Galaetiva villosa	1.5
23	Hibiscus ova/ifo/ius	2.1
24	Dechasohistia malvus	1.9
25	Commiphora derry/	2.1
26	Sapindus omarginatus	1.5
27	Dichroslachya cinerea	2.1
28	Ischaemum pilosum	1.2
29	"Acacia nilotica	1.1
30	A"cacia leucophloea	1.9
31	Tridax procumbens	0.9
32	Se/aria lomentosa	1.2
33	Boswellia serrata	1.9
34	Gymnosporia Montana	2.1
35	Crolalaria hirsute	2.0
36	Bauhinia racemosa	1.5

Most preferred plants = Cymbopogon flexureus (Frequency - 15.5)

Heteropogon contortus (Frequency - 10.9)

CONCLUSION

In the Ramgarh Tiger Reserve, the predator-prey interaction of wild animals is investigated from 2018 to 2021. For the current investigation, parasite stages in the faecal remains of carnivores and herbivores, undigested hairs and bones, and plant epidemal remnants were employed. Initial research focused on the impressions and microscopic look of every potential prey species' hairs as well as the epidermal remnants of all potential food plants and grasses. It was discovered that there was a substantial majority of small and big sized prey species in the undigested remnants of 12 different prey species. The scat tests showed that tigers in Ramgarh do not hunt on gaurs since the bigger prey weighs more than the tiger. However, predation on Indian hares occurs fairly often. Four-horned antelope and langurs are sometimes preyed upon by tigers in the RTR.

Sambar (Cervus unicolor) pellet samples from 50 were analyzed, and it was discovered that they consume grasses in Ramgarh as well as 46 other plant species. They preferred temada, sorghum, and cymbopogon the most often. Similarly, it was shown that Muntiacus muntjac used 36 distinct plant species throughout the research period, with a strong predilection for Cymbopogon and Heteropogon.

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