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Overview of the Condition of Jungle Cats (*Felis chaus* Schreber, 1777) in Rural Purba Bardhaman District, West Bengal, India

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Abstract: The present study was conducted on jungle cats in the unprotected rural village of Purba Bardhaman, West Bengal, India. It has been found that jungle cats caused the death of only 18.1% of the total poultry kept. Surveys were conducted to determine the number of poultry birds killed during the months of March (potato harvest), May (Paddy harvest) -when rodents are abundant in the fields and June (rainy season) when rodents are scarce in the field. The questionnaire survey conducted during the study period revealed that 0.8 ± 1.1 ducks and 0.2 ± 0.5 chickens were lost during March, 0.7 ± 1.1 ducks and 0.23 ± 0.5 chickens were lost during May and 0.4 ± 0.6 ducks and 0.1 ± 0.3 chickens were lost during June of the year. ANOVA (Analysis of Variance) did not reveal any significant differences in the number of the poultry birds killed during the three months. The jungle cats used seldom visited piles of tiles near occupied houses as den sites in contrast to the hollow tree trunks or abandoned dens normally used. Mother and kitten social groups were observed during noon time in the fields. Education played a significant part in improving the villagers' perception of jungle cats.

Keywords: Behaviour, Poultry bird, Jungle cat, Bardhaman, *Felis*

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Introduction

Jungle cats are distributed from Africa to South East Asia (Abu-Baker *et al.*, 2003). Jungle cat (*Felis chaus*), the most common type of wild cat in India, is greyish brown or buff in colour and have blackish tufts of hair at the tips of their ears. They have two black stripes around their forelegs and tail (Menon, 2014). In India, melanistic individuals have also been recorded (Chakraborty *et al.*, 1988). In India they are generally about 4 kg in

weight. The natural habitats of jungle cats are the grasslands, scrublands and reedy banks of rivers and marshes (Menon, 2014). In tropical Asia they have been observed to adapt well to the agricultural fields (Tikader, 1983). Recently they have also been recorded in the unprotected areas of Haripur district, Pakistan (Anjum *et al.*, 2020) and at elevations of 3000-3300 m from Annapura Conservation Area, Nepal (Bikram *et al.*, 2020).

Four sub-species of jungle cats are found in India- *Felis chaus affinis* (Gray, 1830)- Northern India; *Felis chaus prater* (Pocock, 1939)- Western India; *Felis chaus kutas* (Pearson, 1832) - Central India; and *Felis chaus kelaarti* (Pocock, 1939)- Southern India.

They have been observed to negatively impact the lives of farmers by killing their poultry birds (Khan and Beg, 1986; Mukherjee, 2008; Ogurlu *et al.*, 2010). In India, jungle cats are found both in the protected areas of reserve forests and the unprotected areas of the rural villages. In India, jungle cats are listed in the Schedule II of Wildlife Protection Act, 1972 (Government of India, 1972). Hunting of jungle cats is prohibited in India. They are Least Concern (LC) in the IUCN Red List Category (Gray *et al.*, 2016). In the rural villages as they are not constantly supervised by forest guards, they are vulnerable to being killed by the villagers in retaliation for killing their poultry birds. The aim of the study was to determine the actual damage done by these jungle cats, their behaviour and relationship with the local villagers in the unprotected areas of rural Purba Bardhaman district of West Bengal, India.

In 1972 Dr Ajit Kumar Banerjee, recruited the help of 612 local families in the joint management of 12.7 sq.km of degraded forest in the Arabari forests of West Bengal. One-fourth of the profits from the forests were shared with the villagers. This initial programme later led to the formation of the Joint Forest Management in India. According to the Forest Policy of the Government of India, the participation of local communities living in and around forested areas in conservation became necessary for the preservation and development of forests. The Government of India issued a clear guideline in 1990 for the development of degraded forests with the help of local communities and voluntary organisations (Ministry of Environment and Forest, 2005).

The present study reports brief accounts of behaviour, reproduction, social organization and damage caused by jungle cats in the unprotected

rural village of Purba Bardhaman, West Bengal, India

Materials and Methods

The study was conducted in Belun, Ketugram (23° 38' 24" N, 88° 07'27" E), Purba Bardhaman, West Bengal, India. The poultry hunting behaviour of jungle cat was observed using camera trap (Toguard Hunting Trail Camera, Model: HC-550A) from January 2021- June 2021. Camera trap was also used during February to observe the behaviour of mother and her kittens. Questionnaire survey was conducted to determine the number of poultry birds killed during the months of March, May, June of the study period. March is the month of potato harvest and May is the month of paddy harvest. Rodents are abundantly present in the field during these two months. June is the first month of the rainy season and due to the flooding of their burrows, the rodents are hard to find in the field during this month. ANOVA was performed to determine if there was any difference in the number of poultry birds lost during these three months. Questionnaire survey was also conducted to determine the villagers opinions regarding the jungle cats during December 2020. Only the household heads were interviewed and the questionnaires were printed in Bengali to enable the villagers to read the questionnaires. If the household head was illiterate then one of the educated villagers recruited for the study, along with the researcher read the questionnaire to the household head. The villagers were also informed of the purpose of the survey and their verbal consent was taken for publishing the data. Information regarding the level of education of the household head, his/her occupation, monthly income, economic status (Above Poverty Level or Below Poverty Level), type and number of poultry birds kept and lost due to jungle cats and their opinions about jungle cats were collected. The occupations were divided into two categories-(a) Field contact job (FC) (agriculture and day labour) and (b) No field contact job (NFC) (driver, purohit,

tea seller, grocery shop owner, barber, builder, rail pensioner and fish seller). The opinions regarding jungle cat were divided into three categories-(a) Kill them (very hostile), (b) Chase them away (moderately hostile) and (c) Leave them alone (nonhostile). The education levels were found to be no education (Zero), primary level (PL, class 1-5), secondary level (SL, class 6-12) and graduation (CL). The education level of the household heads was divided into two categories- (a) Low education level (zero and PL) and (b) High education level (SL and CL). The collected data were subjected to Chi square test to determine whether there was any relationship between the level of a villager's education and extend of his/her hostility towards jungle cat. Chi square test was also performed on the collected data to determine if the type of occupation performed by the villager influenced his/her opinion regarding jungle cats. The villagers only kept chicken and duck in their houses. The birds were not locked up during the day and were allowed to roam freely nearby the houses. The birds were kept in the poultry sheds during the night time. ANOVA was performed on the poultry lost data to determine if there was any difference in the number of poultry birds lost during the different months of data collection. All statistical analysis were performed with GraphPad Prism 9.0 software.

Results and Discussion

Hunting behaviour:

The villagers kept the poultry birds in rudimentary wooden sheds of variable dimension. The wooden sheds observed during the study period were of the dimension of 109.22 x 63.5 x 31.75 cm³. The wooden sheds were used to store roughly 10-11 poultry birds. An opening of roughly 25.4 x 7.62 cm² was left to maintain the air flow into the wooden shed for the birds. The male jungle cat named 'D1' was observed to try to steal poultry birds through this opening (Fig. 1). In the rainy season, 'D1' made 13 attempts during the month of June 2021 to steal poultry birds in that single house (Table 1). The questionnaire

survey conducted during the study period revealed that 0.8 ± 1.1 ducks and 0.2 ± 0.5 chickens were lost during March, 0.7 ± 1.1 ducks and 0.23 ± 0.5 chickens were lost during May and 0.4 ± 0.6 ducks and 0.1 ± 0.3 chickens were lost during June of the year 2021. Analysis of the data showed that there was no significant difference in the number of ducks taken during the three months [ANOVA: $F(2, 168) = 1.955$, $p = 0.1448$]. No significant difference was found in the number of chickens taken during these months [ANOVA: $F(2, 165) = 1.479$, $p = 0.2308$]. Out of the 1020 poultry birds kept, only 185 poultry birds (18.1% of the total) were lost during the study period. The jungle cats were also observed hunting in the paddy fields for rodents.

Fig. 1: Jungle cat attempting to steal poultry from shed.

The preferred prey of jungle cats is typically of small size and weight less than 1 kg. Small mammals like gerbils, squirrels, hare, mice and rats are the jungle cat's most common prey (Sunquist and Sunquist, 2002). In a study on jungle cats in Sariska Tiger Reserve, scat analysis showed that 73% of the daily diet of jungle cats consists of rodents (Mukherjee *et al.*, 2004). Jungle cats are considered powerful enough to kill large mammals like spotted deer fawn, subadult gazelle and young swine. Small amphibians like frogs, reptiles like lizards and insects are also consumed by jungle cats. Small snakes like whip snakes, sand snakes and racers are killed by jungle cats. Birds like ducks, pheasants, jungle fowl, partridge, larks, sparrows and peafowls are also prey items for jungle cats. In Russia, ducks and coots are the main prey of jungle cats during the winter (Sunquist and Sunquist, 2002). In Turkey, jungle

cats hunted aquatic birds near the shores of water bodies (Ogurlu *et al.*, 2010). In agricultural villages, jungle cats have been observed preying on local poultry birds like chicken and ducks. Jungle cats have been observed to dive into waterbodies and kill fishes. In Uzbekistan, jungle cats have been recorded eating fruits (Sunquist and Sunquist, 2002).

Reproduction and Social organization:

The female jungle cat named 'Daisy' was found to have given birth to kittens in February, 2020. The camera trap had revealed that 'Daisy' used tile piles around the village houses as den sites (Fig. 2). 'Daisy' also used abandoned houses, seldomly visited cow sheds and thorny bushes as den sites. 'Daisy' moved her litter of two kittens after every three days. 'Daisy' moved her kittens to the paddy and mustard fields when they were around nearly two months old (Fig. 3).

Fig. 2: Jungle cat using a pile of tiles as her den site.

Fig. 3: Jungle cat kittens in mustard field.

Mating between jungle cats generally takes place in December and June. In the Middle East Jungle cat mating takes place in January-February (Allayarov, 1964). During the mating season, the males follow the females, followed by rapid

vocalization from both jungle cats. The females breed twice per year and the gestation period is usually 63-66 days. Females use hollow trees, tree roots, paddy fields, dense reed beds and thorny hedges as den sites. Males do not take part in parental care. The young ones usually suckle till they are 90 days old. At around 6 months old, the young ones can kill their own prey and they leave their mother around 8-9 months old (Prater, 1971; Sunquist and Sunquist, 2002).

Jungle cats are mainly solitary in nature. Social contact with other members of their species mainly occurs during mating season. Relatively long term contact between individuals is maintained only between the mother and her kittens. Territories are maintained by scent marking. In captivity, male jungle cats have been observed to mark objects by cheek rubbing (Sunquist and Sunquist, 2002).

Villagers' perspective:

The survey showed that the average monthly income of the village was Rs. 82320 $\pm$ 4267. 80% of the surveyed households belonged to the APL (Above Poverty Line) category and 20% of the villagers belonged to the BPL (Below Poverty Line) category. This determination was done by checking the BPL cards (issued by the Government of India) of the household heads. The survey showed that 7% of interviewees wanted to kill, 23% of the interviewees wanted to chase away and 70% of the interviewees wanted to leave the jungle cats alone. 46% of the interviewees belonged to the low education level and 54% of the interviewees belonged to the high education level. 69% of the interviewees performed field contact jobs and 31% of the interviewees performed no field contact jobs (Table 1). Chi square test showed that the household heads with high education level displayed significantly less hostility towards the jungle cats than households heads with low education level (Chi square test: $\chi^2=5.984$, $df=1$, $p<0.0144$). Chi square test showed that type of occupation did not significantly influence the hostility of the villagers towards the

Table 1: Information about the villagers

Sl. No.	Household head name	Gender of household head	Main occupation	Education level	Age category (YA =20+ M = 30-50 S = 50+ years)	Kill	Chase away	Leave them alone
1	Mihir Ghosh	Male	Agriculture	Class-4	S	0	0	1
2	Ashok Hazra	Male	Agriculture	None	S	0	0	1
3	Laxminarayan Saha	Male	Agriculture	Class-9	M	0	0	1
4	Utpal Hazra	Male	Agriculture/Belun jol bari resort worker part time	BA pass	YA	0	0	1
5	Uday Hazra	Male	Agriculture	Class 12	YA	0	0	1
6	Ganesh Hazra	Male	Agriculture	Class 10	YA	0	0	1
7	Rabi Hazra	Male	Agriculture/ Fish shop owner	Class 9	M	0	1	0
8	Tamal Hazra	Male	Agriculture	Class 12	M	0	0	1
9	Dulal Hazra	Male	Toto driver/Car driver	Class 3	M	0	1	0
10	Prasanth Das	Male	Agriculture	Class 9	M	0	0	1
11	Uttam Ghosh	Male	Agriculture	Class 10	M	0	1	0
12	Ambikacharan Bhattacharya	Male	Contractual School Teacher	Graduation	M	0	0	1
13	Gautam Ghosh	Male	Agriculture	Class 7	M	0	0	1
14	Nimai Ghosh	Male	Agriculture	Class 9	M	0	1	0
15	Goracharan Mondal	Male	Agriculture	Class 12	M	0	0	1
16	Nandokumar Pal	Male	Agriculture	Class 9	M	0	0	1
17	Allacklata Paramanik	Female	Day labour	Class 4	M	0	0	1
18	Suchitra Saha	Female	Agriculture	Class-5	M	0	0	1
19	Arup Misra	Male	Agriculture	Class 10	M	0	1	0
20	Sukumar Saha	Male	Grocery shop owner	Class 12	M	0	1	0
21	Jaharlal Saha	Male	Day labour	Class 8	M	0	0	1
22	Satyakali Bhattacharjo	Male	Purohit	Class 10	S	0	1	0
23	Pranab Saha	Male	Shop owner	Class 8	M	0	1	0
24	Amar Hazra	Male	Rail-retirement	Class 5	S	0	1	0
25	Buddhadeb Paramanik	Male	Hair Salon	Class 8	S	0	1	0
26	Depad Hazra	Male	Day labour	None	M	0	0	1
27	Basudeb Paramanik	Male	Day labour	Class 2	M	0	0	1
28	Supal Ghosh	Male	Day labour	Class 8	M	0	0	1
29	Rupra Hazra	Male	Day Labour/ Agriculture	Class 4	M	0	0	1
30	Bisajoy Hazra	Male	Day Labour	Class 4	M	0	0	1
31	Sisir Saha	Male	Day labour	Class 9	M	0	0	1
32	Suken Ghosh	Male	Agricultural money lender	Class 9	M	0	1	0
33	Kalan Kumar Ghosh	Male	Rail-retirement	Graduation	S	0	0	1
34	Manik Ghosh	Male	Agriculture	Class 5	M	0	0	1
35	Shamal Ghosh	Male	Day labour	Class 10	M	0	0	1
36	Shaya Ghosh	Female	Agriculture/Day labour	None	S	0	1	0
37	Niranjan Mondol	Male	Teacher	Graduation	S	0	0	1

38	Ramprasad Hazra	Male	Day labour	None	M	1	0	0
39	Madhusudhan Hazra	Male	Day labour	None	M	0	0	1
40	Manik Hazra	Male	Agriculture	None	M	0	0	1
41	Benukar Hazra	Male	Day labour	None	M	1	0	0
42	Gayaram Hazra	Male	Fisherman	Class 4	M	1	0	0
43	Chinta Hazra	Female	Day labour	None	S	0	1	0
44	Tarun Hazra	Male	Day labour	Class 2	M	0	0	1
45	Sonaton Hazra	Male	Agriculture/ Day labour	None	S	0	1	0
46	Kamal Hazra	Male	Day labour	Class 2	M	0	0	1
47	Shymal Hazra	Male	Agriculture/ Day labour	Class 8	M	0	0	1
48	Malai Hazra	Male	Day labour	Class 4	M	0	0	1
49	Bikash Ghosh	Male	Agriculture	Class 12	M	0	0	1
50	Subash Saha	Male	Agriculture/ Day labour	Class 8	M	0	0	1
51	Mitai Ghosh	Male	Day labour	Class 9	M	0	1	0
52	Santosh Hazra	Male	Driver	Class 8	M	0	0	1
53	Uttam Ghosh	Male	Army retirement	Class 8	S	0	0	1
54	Palash Pattak	Male	Driver	Class 10	M	0	0	1
55	Shymal Saha	Male	Agriculture/ Day labour	Class 4	M	0	0	1
56	Prashanto Saha	Male	Day labour	Class 8	M	0	0	1
57	Gautam Saha	Male	Day labour	Class 4	M	0	1	0
58	Mitu Saha	Male	Driver	Class 8	M	0	0	1
59	Samir Hazra	Male	Driver	Class 10	M	0	0	1
60	Sonaton Hazra	Male	Day labour	zero	S	0	0	1
61	Dilip Saha	Male	Agriculture	Class 8	M	0	1	0
62	Mahadeb Pramanik	Male	Agriculture/ Day labour	Class 7	M	0	0	1
63	Uttam Ghosh	Male	Tea stall owner	Class 8	M	0	0	1
64	Sanjay Hazra	Male	Driver	Class 6	M	0	0	1
65	Ganga Hazra	Female	Rail-retirement man's widow	Class 1	S	1	0	0
66	Niru Bairago	Male	Agriculture/ Day labour	zero	S	1	0	0
67	Dhanu Hazra	Female	Part time labourer	zero	S	0	0	1
68	Sonko Hazra	Male	Day labourer	zero	S	1	0	0
69	Sisir Saha	Male	Agriculture	zero	S	0	0	1
70	Sankori Bhattacharjee	Male	Agriculture	Class 10	M	0	0	1
71	Shamaprasad Bhattacharjo	Male	Agriculture	Class 10	M	0	0	1
72	Narayan Dhar	Male	Day labourer	Class 6	S	0	0	1
73	Ananta Mondol	Male	Shop day labour	Class 8	S	0	0	1
74	Gautam Ghosh	Male	Agriculture	Class 10	M	0	0	1
75	Krishna Prasad Pattak	Male	Purohit	Class 8	S	0	0	1
76	Debnarayan Ghosh	Male	Agriculture	Graduation	M	0	0	1
77	Haraprasad Pattak	Male	Tution	Graduation	M	0	0	1
78	Karthik Ghosh	Male	Agriculture/ Day labour	Class 5	M	0	0	1

79	Madhav Hazra	Male	Driver	Class 4	M	1	0	0
80	Narayan Hazra	Male	Day labourer	zero	M	0	1	0
81	Saki Gopal Hazra	Male	Day labourer	Class 3	M	0	0	1
82	Sonat Hazra	Male	Day labourer	zero	M	0	0	1
83	Banesar Hazra	Male	Day labourer	Class 9	M	0	0	1
84	Tarakeshwar Hazra	Male	Day labourer	Class 4	M	0	0	1
85	Poritosh Hazra	Male	Poultry farmer	Class 9	M	0	0	1
86	Minaton Hazra	Male	Driver	Class 2	M	0	0	1
87	Premnath Hazra	Male	Agriculture	Class 9	M	0	0	1
88	Somnath Hazra	Male	Agriculture	Class 10	M	0	0	1
89	Joydep Hazra	Male	Agriculture	zero	S	0	0	1
90	Sanju Hazra	Male	Builder day labour	Class 7	M	0	0	1
91	Sukumar Hazra	Male	Builder day labour	zero	S	0	0	1
92	Narayan Hazra	Male	Builder day labour	Class 6	M	0	0	1
93	Sadin Hazra	Male	Builder day labour	Class 6	M	0	0	1
94	Dinobabdhru Hazra	Male	Day labourer	zero	M	0	0	1
95	Madhu Hazra	Male	Day labourer	zero	M	0	0	1
96	Mahadeb Hazra	Male	Day labourer	zero	S	0	0	1
97	Karthik Hazra	Male	Driver	Class 4	M	0	0	1
98	Narugopal Hazra	Male	Builder day labour	zero	S	0	0	1
99	Toton Hazra	Male	Agriculture/ Day labour	Class 2	M	0	1	0
100	Ramgopal Hazra	Male	Builder day labour	zero	S	0	1	0

jungle cat (Chi square test: $\chi^2=0.7764$, $df=1$, $p>0.3782$).

Local communities play an important role in the conservation of their surrounding environment and the animals living in that area. Local communities are motivated to improve their surrounding conditions in order to improve their own living conditions. Studies have shown that education enabled people to make more informed decisions. Higher education levels allowed people to work towards more sustainable development of their environment (Anderson and Strecker, 2012). Local communities living at forest fringes in Zimbabwe when given environmental education understood the need to conserve their natural resources (Matsvange *et al.*, 2016). Environmental education is normally given as part of the standard education in the schools in West Bengal from classes 9-12. So, the people who have received

education to at least Madhyamik (Class 10) will have some knowledge of the need for protection of their surrounding nature and natural resources. This situation could explain the reason why household heads with high education levels were less hostile to jungle cats.

Habitat destruction and poaching are two of the main reasons behind the reduction in the population of jungle cats. In India the villagers mainly come into conflict with the jungle cats when the jungle cats raid their poultry birds (Tikader, 1983). Poaching of jungle cats is easier in the unprotected villages than in the protected areas of the Reserve forest where the animals are under the constant supervision of the forest guards. So, local help is essential for the conservation of wild animals residing in the unprotected areas of India.

Conclusion

The jungle cats in the rural village of Belun caused only minimal damage to the poultry birds. Due to the mostly positive feelings of the villagers regarding the jungle cats, the jungle cats were comfortable enough around people to use places near their houses as den sites. Improving the wooden sheds where the poultry birds were kept could reduce the amount of poultry birds lost due to jungle cat predation. This could help to improve the opinions of the villagers towards the jungle cats and get their help in protecting the jungle cats in these unprotected areas of rural West Bengal.

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