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## Causes and Effect of Tiger Mortality in Corbett Tiger Reserve, Ramnagar, Uttarakhand, India

**Bhupender Kumar**

Research Scholar, Department of Zoology,  
S.B.S. Govt. P.G. College, Rudrapur, Udham Singh Nagar, Uttarakhand, India

**R. K. Singh**

Associate Professor, Department of Zoology,  
S.B.S. Govt. P.G. College, Rudrapur, Udham Singh Nagar, Uttarakhand, India

**Jyoti Chauhan**

Research Scholar, Department of Zoology,  
R.H. Govt. P.G. College, Kashipur, Udham Singh Nagar, Uttarakhand, India

### **Abstract:**

*Tiger conservation is a big issue in India as well as around the world now a day. The tiger, Pantheratigris is a top carnivore in India. The tiger is endangered mammals because it's mortality rates has grown in India; thus the population of tiger is declined. The tiger is present lesser than 2,300 in India, according to census data of 2014 and 214 tigers are present, according Corbett Tiger Reserve (CTR), census data of 2010. So the present study was designed to investigate causes and effect of tiger mortality in CTR. The most causes of death are intraspecies & interspecies fight, injured, disease, old age, accident etc., but mostly death occurred by intraspecies fight. Disturbance in carrying capacity of the area leads to mortality situation, struggle for existence is a natural phenomenon for vital needs. Therresult of that, the production new generation is affected. Such type of situation, e.g. mortality affectsthe food chain, ecological pyramid, ecosystem and genetic viability.*

**Keywords:** Pantheratigris, intraspecies, interspecies, mortality, census data.

### **1. Introduction**

Tiger (Pantheratigris), the largest living feline on earth, holds a significant position in the uppermost trophic level of the ecological pyramid in the wild/forest and is grouped in schedule I of the wildlife protection Act of India (Kalaivanan et al. 2015). However, the species waging a grim battle for survival (chundawat et al. 2008), with habitat loss and demand for body parts taking a heavy toll on the dwindling population. In present time the population of tiger is decreasing rapidly. According to the census of 2014 the numbers of tigers are less than 2,300 in India and 214 tigers are present in Corbett Tiger Reserve (CTR) according to the last census of 2010. So it is important to analyze the causes of every tiger's death.

The tiger is an Endangered Mammal because tiger's mortality increased in India. Primary Causes of tiger's mortality are natural death and secondary (Kalaivanan et al. 2011) Cause of death by poaching. According to the common aetiology of natural death in wild tigers are old age, injuries caused during hunting (interspecies fight), territorial (intraspecies) fights, and disease (Tigernet report 2014). The important causes of increment in tiger mortality in the CTR are intraspecies and interspecies struggle. The death of tiger by intraspecies struggle is occurring in the mating season.

### **2. Study Area**

The Corbett Tiger Reserve (CTR) is located between 78° 39'40" E to 79° 09'23" E longitude and 29° 48' N to 29° 23'32" N latitude. The altitude of the region ranges between 360 m (1,181 ft) and 1,040m (3,412 ft). The Present area of the Corbett Tiger Reserve 1288.31KM<sup>2</sup>, which includes an area of 520.82 Km<sup>2</sup> of Corbett National Park, 301.17 KM<sup>2</sup> of Sonanadi Wildlife Sanctuary and 466.32 Km<sup>2</sup> of buffer area for both units. In CTR. 575 species of birds, 26 species of reptiles, 7 species of amphibians and 50 species of mammals, are found. The floral diversity of CTR is also mind boggling. In CTR, 110 species of trees, 51 species of shrubs, 27 species of climbers & 33 species of bamboo and grass are found.

### 3. Materials and Methods

The data on tiger mortality are taken from Corbett Park Authority (Official). The total 13 years' data are used for this study. After analysis of all data year wise and sex wise with the cause of death had been graphically presented (Table – 1).

S. No.	Species & Sex	Date	Place/Area	Cause of Death
1	Tiger (M)	05-3-2001	Dhikala Range, Leedkhaliya	Intraspecies fight
2	Tiger (M)	11-4-2001	At the Junction of Dhela & Bijrani Range	Intraspecies fight
3	Tiger (F)	16-12-2001	Palain Range, Mandalty C.No.-9	Injury in Brain
4	Tiger (F)	26-5-2002	Mandal Range, Sankar Beet	Injury of Neck
5	Tiger (F)	17-8-2002	Kalagarh Range Nalkatta Beet	Intraspecies fight
6	Tiger (F)	23-4-2002	Kalagarh Range	Disease of stomach
7	Tiger Cub(F)	07-1-2004	Kalagarh Range	Intraspecies fight
8	Tiger Cub(F)	09-1-2004	Kalagarh Range	Intraspecies fight
9	Tiger (F)	26-1-2004	Bijrani Range	Injured
10	Tiger (M)	11-2-2004	Jhirna Range	Natural
11	Tiger (F)	09-1-2006	Bijrani Range	Intraspecies fight
12	Tiger (F)	26-2-2006	Dhela Range	Intraspecies fight
13	Tiger (F)	07-3-2006	Dhela Range	Intraspecies fight
14	Tiger Cub(F)	03-1-2007	Sarpduli Range	Interspecies fight
15	Tiger (F)	20-1-2007	Maidavan Range	Accident
16	Tiger Cub (F)	15-6-2007	Dhela Range	Natural
17	Tiger (M)	22-9-2007	Kalagarh Range	Injured
18	Tiger (F)	31-10-2007	Ramnagar Tiger Reserve	Infection in Brain
19	Tiger (M)	31/1-11-2007	Kalagarh Tiger Reserve, Sonanadi Range	Intraspecies fight
20	Tiger (F)	10-3-2008	Ramnagar Tiger Reserve, Jhirna Range	Intraspecies fight
21	Tiger (F)	04-11-2008	Kalagarh Range	Natural
22	Tiger (M)	09-3-2009	Dhela Range	Natural
23	Tiger (M)	17-3-2009	Dhela Range	Intraspecies fight
24	Tiger (M)	27-5-2009	Maidavan Range	Interspecies fight
25	Tiger (M)	01-8-2009	Mandal Range	Intraspecies fight
26	Tiger (M)	13-12-2009	Dhikala Range	Intraspecies fight
27	Tiger (F)	16-12-2009	Sarpduli Range	Natural, Old age
28	Tiger (M)	05-1-2010	Dhikala Range Kanda Block C.No.-23	Intraspecies fight
29	Tiger (M)	11-1-2010	Dhikala Range Kanda Block C.No.-1 A	Natural
30	Tiger Cub (M)	02-7-2010	Kalagarh Range Paterpani C.No.-9	Injured
31	Tiger (F)	25-1-2011	Kalagarh Range Dhara Block C.No.-1	Interspecies fight
32	Tiger (M)	19-2-2011	Kalagarh Range Dhara Block C.No.-7	Intraspecies fight
33	Tiger (F)	01-4-2011	Kalagarh Range Dhara Block C.No.-12 & 13 Joint	Natural
34	Tiger Unknown	03-5-2011	Sarpduli Range Dhikala Block C.No.-24	Intraspecies fight
35	Tiger (F)	07-6-2011	Kalagarh Range Dhara Block C.No.-7	Intraspecies fight
36	Tiger (F)	28-7-2011	Dhela Range Sawaldebhabar Block No.-1	Accident
37	Tiger (F)	15-9-2011	HimmatpurDotiyal, Nainital Zoo	Intraspecies fight
38	Tiger Cub (F)	14-12-2011	Dhela Range Dhela Bhabar Block C.No.5 &6 joint	Natural
39	Tiger Cub (M)	13-1-2012	Jhirna Range C.No.-8	Infection in trachea
40	Tiger (M)	20-2-2012	DhaulakhandC.No.-11	Intraspecies fight
41	Tiger Unknown	08-4-2012	Phooltal Block C.No.-10	Natural
42	Tiger (F)	24-5-2012	Bijrani Range, Phooltal Block C.No.-9	Poaching
43	Tiger (F)	17-1-2013	Amangarh Range North Jaspur, Block C.No.-1A	Natural
44	Tiger (F)	18-4-2013	Ramnagar Range, Bailpadav	Injured
45	Tiger (F)	27-5-2013	Kalagarh Tiger Reserve, Kaseruwa C.No.-11	Natural

Table 1: Details about Tiger Death Causes since 2001 to 2013 in Corbett Tiger Reserve.

Source: Corbett Part Authority (Official).

**4. Result and Discussion**

The statistics provided by the CTR park authority (Official) Ramnagar of India says that 45 tigers lost their lives between 2001 to 2013. In that one tiger has been poached by unnatural causes and remaining 44 tigers died by a variety of region e.g.- intra species and interspecies fighting, injured, old age, disease, accident and due to conflict with humans (Table -2). Most of death belongs to intra species and interspecies fighting in all types of wild animal. A mostly interspecies fight occurred for the mainly ecological needs, prey and habitat for other sympatric species like leopard (*Panthera pardus*) and intra species fight mainly occur during mating season. Sometimes all this attracts single male are attracted and in this situation a vicious fight can break out over the female (P. Hanley 1961).

The data of Table-3 are categorized according loss of tiger sex and year wise in this data male, female, cub male, cub female and unknown is shown. The total estimate of lost are 45 tigers from 2001 to 2013. In that 14 are males, 22 females, 2 cub males and 5 cub females and 2 are unknown in CTR. Thus the highly lost is found in female tiger. In that 22 females and 5 cub females are lost. The harm of female tiger lost, affects the process of breeding mostly. The result of that the ecological pyramid, ecosystem and food chain are most effect on the park. The tiger is a territorial animal and it marks, its boundary by different ways. The stress is found in the habitat of the tiger and stress in ecological pyramid. It shows that there is insufficient area, according to the need of the tiger. The tiger plays a pivotal role in the ecosystem. The most of the ecosystem of CTR depends upon the tiger because the tiger is the top carnivore of the ecological pyramid.

Year	Intra species fight	Natural	Injured	Inter species fight	Disease	Accidents	Poaching	Total
2001	2	-	1	-	-	-	-	3
2002	1	-	1	-	1	-	-	3
2003	-	-	-	-	-	-	-	-
2004	2	1	1	-	-	-	-	4
2005	-	-	-	-	-	-	-	-
2006	3	-	-	-	-	-	-	3
2007	1	1	1	1	1	1	-	6
2008	1	1	-	-	-	-	-	2
2009	3	2	-	1	-	-	-	6
2010	1	1	1	-	-	-	-	3
2011	4	2	-	1	-	1	-	8
2012	1	1	-	-	1	-	1	4
2013	-	2	1	-	-	-	-	3
Total 13 Years	19	11	6	3	3	2	1	45

Table 2: Year wise mortality of tiger with causes.

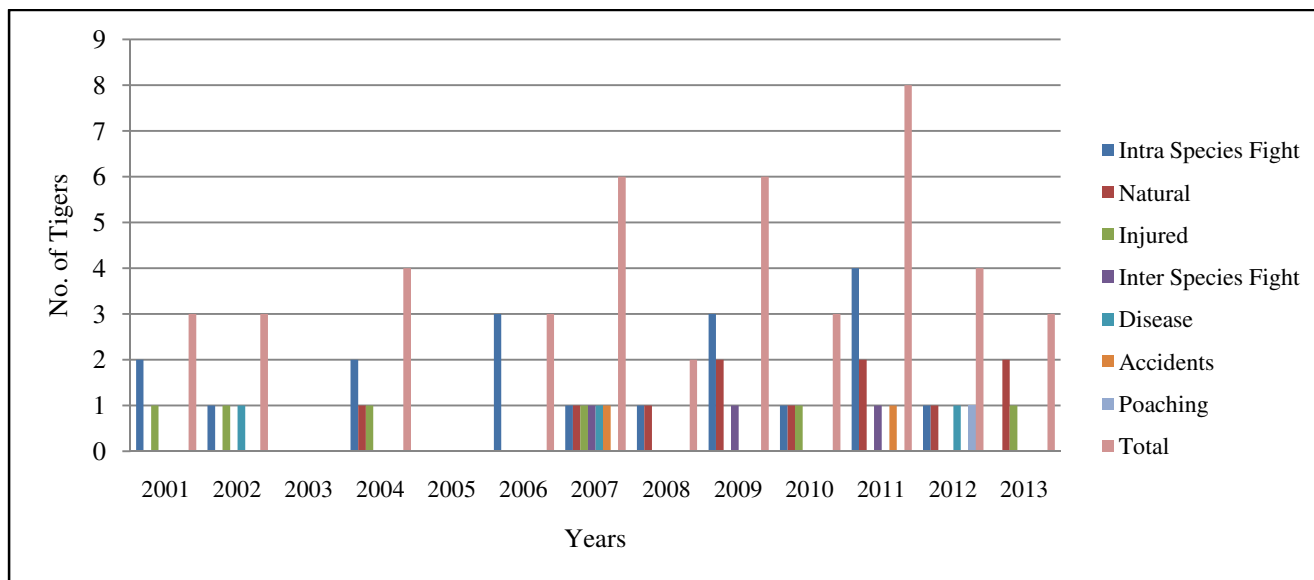


Figure 1: Graph showing the mortality of tiger with causes.

Year	Tiger					Total
	M	F	C(m)	C(f)	U	
2001	2	1	-	-	-	3
2002	-	3	-	-	-	3
2003	-	-	-	-	-	-
2004	1	1	-	2	-	4
2005	-	-	-	-	-	-
2006	-	3	-	-	-	3
2007	2	2	-	2	-	6
2008	-	2	-	-	-	2
2009	5	1	-	-	-	6
2010	2	-	1	-	-	3
2011	1	5	-	1	1	8
2012	1	1	1	-	1	4
2013	-	3	-	-	-	3
Grand Total	14	22	2	5	2	45

Table 3: Year wise loss of tiger with sex.

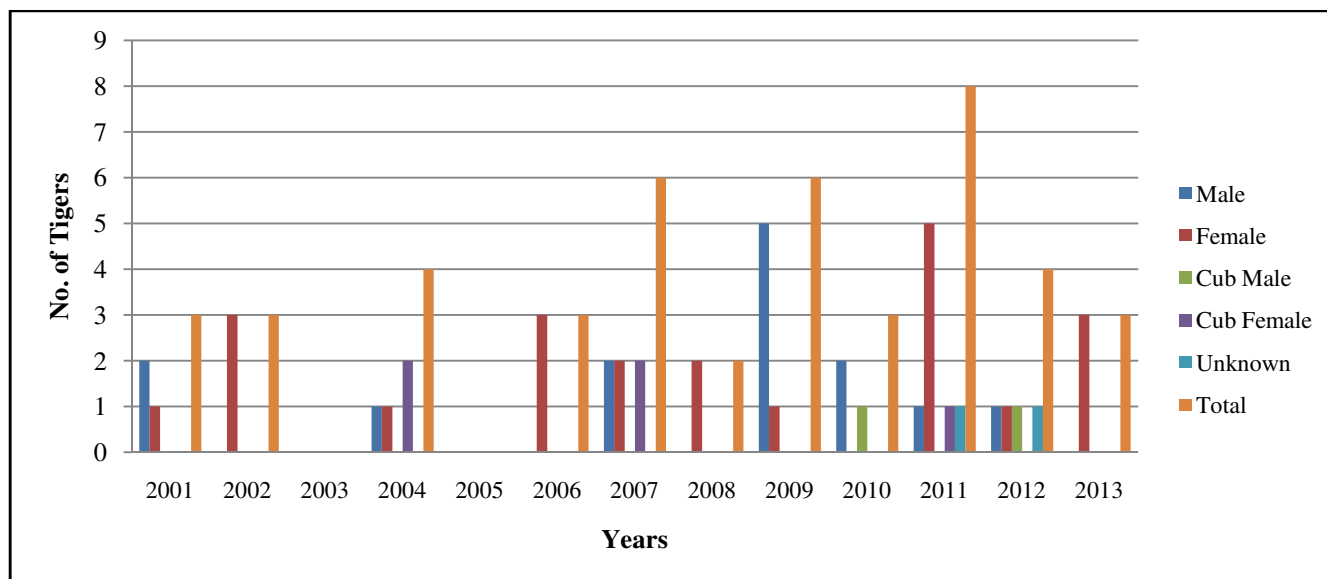


Figure 2: Graph showing the mortality of tiger year wise with sex.  
M- Male, F- Female, C (m) – Cubmale, C(f) – Cub female, U- Unknown

## 5. Conclusion

From the overview of present result, it can be concluded that the total loss of tiger is due to different causes e.g.-intraspecific & interspecific fighting, injuries, old age, disease, accident and human-tiger conflict, etc. This loss affects the ecological balance of CTR because it is a top carnivore and intraspecific fighting is also affecting the total counting of the tiger. The loss of female tiger is more dangerous than the male tiger because the female tiger is the producer of new generation.

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