

## Incidence of Electrocution of a Leopard (*Panthera pardus*) in the Nilgiris, Tamil Nadu

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### Abstract

With the increase in the human population over the past few years there has been a constant interaction between humans, livestock and wild animals. Human settlements have great impact on wild animal-habitat ultimately leading to destruction and fragmented habitats. When a wild animal's habitat is altered due to various factors, an alternate adaptive way of existence is resorted by the wild animals, and this forces them to move through human settlements unaware of the impending danger. Electrocution has been reported in various animals and has been a case of accidental exposure from either low voltage or high voltage electric supply. The Nilgiri Biosphere Reserve (5520 km<sup>2</sup>) comprises of various fauna and flora, but with the rising population and the human settlements not only deprived the wild animals of the use of significantly large areas of habitat but also deprived them of significantly preferred habitat. Human-wildlife conflicts were found to be intensified as population growth forced the development activities which infringed on wildlife habitats. This led to fragmentation and declining of habitat quality, eventually causing competitions between humans and various wildlife species with regard to space and resources and stressed wild animals often turned to crops or livestock for food. In the Nilgiris there are high end power lines and these lines that carry hydro electric power from the lake from which it is derived. These power lines pass adjoining forest regions and leopard being partially arboreal must have come in contact with one of the lines during predatory hunt or during wander. This paper deals with the case of a male leopard that was forced out from its habitat due to indwelling forces and was a victim of an unfortunate electrocution.

**Keywords:** Electrocution; Leopard; Conflict; Wild pigs

### Introduction

Electrocution has been found to be one of the common causes of death in wildlife throughout and does not give us a clear cut picture, as the wild animal carcasses are usually decomposed and are not fit for postmortem examination. Electrocution may be accidental or a deliberate affair, just as a way to mitigate the human wildlife conflict arising in regions, especially the fringes where there is a recorded overlap of human, livestock and wildlife activity. The term for low electric shock is stray voltage which is usually very difficult to detect and is not lethal which is often associated with minor forms of stress in exposed animals, whereas serious electric shock mostly involves discharge of electricity from over 80V and more frequently in the 110-380V range which are commonly used throughout the world [1]. Much of what is known about the electrocution comes from the human forensic medicine, in humans a current at the range of 10 mA to 20 mA may be capable of causing painful to severe shock, whereas a current of 100 to 200 mA may be lethal. If the electrical current reaches 100 mA, ventricular fibrillation of the heart may occur resulting in death [2]. But this varies with the body's resistance quotient and also whether the skin is wet or dry or depending on the conducting surfaces. However the present case is from a place where there is intermittent rainfall throughout the year, this serves as an easy conduction of electricity, as the impeding resistance is less in water.

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### Materials and Methods

The Veterinary surgeon Coonoor town, The Nilgiris district was informed about the presence of the carcass of a male leopard in his jurisdiction. The location of the carcass was identified by an anti poaching watcher. Leopards have been found to be widely distributive in the Nilgiris. A detailed necropsy was done by a team of three Veterinarians. A composite sample (300g) containing stomach and intestinal loop with contents separately and portions of liver, kidney, lung, and heart were collected in 500 ml of saturated sodium chloride. Plain saturated sodium chloride was also sent as control. The various organs such as liver, lungs, kidney, and intestines were stored in 10% formalin for further histopathological investigation.

### Results

Necropsy was done in a systematic manner. Externally, there was a clear entry and exit wound on the carcass, a striking feature, the skin and hair were charred. There was a region of extended charring from the point of shoulder to the mid abdomen region exposing the viscera partially. Internally there was generalized congestion and hemorrhage of the viscera. The oral cavity was inspected and no abnormalities were detected. The teeth were all intact and the gingivae showed congestive changes. The visible mucous membrane was pale pink in color. The peritoneal cavity contained sanguineous fluid (Hemoperitoneum). There were hemorrhage and congestion on the trachea and the lung showed severe congestion. The chambers of the heart were empty and there was petechiation of the epicardium. There were no noticeable changes of the thoracic viscera other than a slight extravasation of sanguinoseous fluid in the connective tissues where the trachea and blood vessels enter the lungs. The abdominal viscera revealed no changes except the kidneys revealed capsular hemorrhage. A generalized congestion was pronounced throughout the viscera and the intestines. The stomach contained about 500-1000 gm of partially digested material and with slurry of flesh and lots of hair, bristles and some semi digested bones. The mucosa of the stomach showed petechiae and the intestinal mucosa were congested. The shape of the spleen was altered and was dark red in color. There was no characteristic anomaly in the brain (Plates 1 to 9). The necropsy findings, were deemed consistent with an acute environmental insult rather than any infectious disease and based on these physical observations and postmortem findings, a diagnosis of electrocution was made.

### Discussion

In general there is a paucity of information on the electrocution of animals. The injuries due to electrocution are common in primates [3] but electrocution of a leopard is one of the rarest events in occurrence. Leopards are solitary animals [4] and have been sharing landscapes with humans in the recent past. The leopards are usually nocturnal and are very timid, they have the habit of carrying their prey to the tree top and consuming it, they have been usually sighted on trees than on ground. The impeding factors affecting the outcome of electric shock of an animal include the nature of the current (direct or alternating), amperage, voltage, path of the current in the body, resistance of intervening tissues, and duration of exposure [1]. Burns are sometimes seen on the skin because this tissue has a high resistance to the flow of current. The mechanism responsible for sudden death following electric shock is thought to be electrical disruption of cardiac and respiratory impulses. A surprisingly small amount of current is required to achieve this effect [5,6]. Electric injuries lead to severe systemic disturbance and massive local tissue injuries [7]. The type of injury and extent of an electric injury is determined by voltage, current strength, resistance to flow duration of contact with source [1]. These injuries can lead to cutaneous necrosis and deep necrosis of soft tissue. The necropsy findings were in concurrence with report given by Bidfell, *et al.* [2]. The histopathological examination of the organs was not possible as the organs crumbled on embedding in the blocks, owing to the decomposition quotient of the organs.

Leopards have been known to cause conflict in this particular region by dog lifting, several cases of human encounters and this was least tolerated by the locals. This was in addition to the damages that the farmers faced by the crop raiding activity of the wild pigs in this region and the adjoining regions. Nearly 50% of the profit was lost on curbing wild pigs. The availability of the highly palatable feed varieties, increase in predator-prey density, increase in competition among the co-existing herbivores and omnivores in the adjoining forest region, carrying capacity of the region, extensive activities or manipulation by human beings in the forest regions have made wild pigs to be an agricultural pest due a constant stress level that pertained in the wild pigs [8].

However, leopards and tigers also share the same landscape and often become accidental targets of poisoning ending down the apex predator that occupies the topmost level in the food chain. This increases the prey population and the damage is double as there is no predator check causing excessive damage than expected that was prevailing [9]. Similarly, Power fences are used in various places to scare and drive away wildlife but the wild animals get conditioned to it eventually and the problem crops up again. Regulation of the voltage supply to the power fences and their maintenance by private farm/estate owners has not been monitored and this could be one of the major causes of death for any wandering leopard in a new territory like this. Sometimes in dense forests such deaths go unaccounted, unnoticed also. Electrocution can be a serious offense if on deliberate usage to combat conflict.

### Conclusions

Though the cause of death of the leopard was established, the source of electrocution could not be determined as there are numerous factors intervening, however in this case there were no electric poles or high tension wires nearby, it could have been accidental or deliberate. Another major factor is the identifying carcasses of wild animals as they are more or less in a semi or fully decomposed state that makes it difficult to come to confirmatory conclusions many a times. So consistent monitoring and marking of these big cats in high density conflict areas should be followed as this will help in curbing potential defaulters. A much intensified awareness program is required in these regions.

#### CARCASS OF THE LEOPARD



#### ELECTROCUTED



Examination of oral cavity and age estimation



NECROPSY



COLLECTION



CONGESTED AND HEMORRHAGIC INTESTINE



HEMOPERITONIUM



KIDNEY

LIVER



## BRAIN



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