

FIRST REPORT OF A FATAL ACCIDENT OF A SALTWATER CROCODILE (*Crocodylus porosus*) DUE TO ELECTROCUTION IN SRI LANKA

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ABSTRACT - An adult 267 ½ cm long, early gravid female saltwater crocodile (*Crocodylus porosus*) found dead in an anthropogenic habitat in a small road side stream at western province, Sri Lanka. The crocodile while catching a bird had accidentally bit a live high-tension electric wire which had tumbled across the stream, and died outstanding to electrocution. The dead specimen was subsequently gifted to University of Sri Jayewardenepura to be used for the World Crocodile Conference – 2013. All relevant measurements were recorded. Physically the body of the dead crocodile was investigated for external parasites, by using surgical procedures the stomach contents were investigated and weighed. The stuffed carcass is presently housed in the museum of the University of Sri Jayewardenepura, Sri Lanka.

KEY WORDS : Salt water crocodile, Electrocuted, Human crocodile conflict.

INTRODUCTION

Sri Lanka is a relatively small island, nevertheless home to human, in addition to a large population of crocodiles and other large wild animals (e.g. leopards, elephants, sloth bears etc.). Humans as well as farm animals getting attacked by wild animals is a common medical problem in Sri Lanka. Snake bites, elephant and crocodile attacks are the most common accidents in the country of which some humans culminate in death annually.

Two species of crocodiles inhabit in Sri Lankan water bodies. The Mugger crocodile, *Crocodylus palustris* lesson, 1831, inhabits in the country's inland reservoirs, streams and rivers (de Silva, 2013) and the salt water crocodile *Crocodylus porosus*, 1801 (Deraniyagala, 1939) is also known as Salties or Estuarine crocodiles, usually inhabits in estuaries and adjacent rivers. The salt water crocodile is considered as the largest living reptile (Deraniyagala, 1936, Ross, 1989; Alderton, 1991.). The two extant species of crocodiles are facing many threats outstanding to anthropogenic activities.

Predominantly due to high demand for crocodile skins to turn out crocodile leather goods such as handbags, shoes, and brief cases etc. millions of crocodiles were killed annually in the world by relentless hunting. Sri Lanka too was a supplier of crocodile skins to gratify the world demand, hence facing a dramatic decline in both crocodile populations commencing the first quarter of the 20th century. However due to the amendment of the Flora and Fauna Protection act (No. 44 of 1964) which included protection to the two crocodiles of the country, the mass killing was stopped.

Humans hunt crocodiles by using various techniques. Using live or dead bait, such as a dog or a monkey, is the most famous method they use. A live pup is tied to a strong line and located on a small platform, which is made from banana stems. The structure is floated where the crocodiles are suspected to inhabit. When the pup begins to struggle the crocodile attacks it, thus getting baited. At this point the line is pulled along with the crocodile to the shore and killed. Ahlip's (1965) reports about using a

barbless double hook, consists with a large eye which the rope is passed, is being used for hunt crocodiles. The hook is attached to a strong line and it is introduced into the stomach of a dead pup, monkey, chicken or chunk of beef etc. and thrown to a location where crocodiles are frequent. When the crocodile swallows the bait, the line is slowly dragged along with the crocodile and killed. Clark (1901) also reports of placing a cattle carcass or a live puppy which is tied to a bund and let it yelp. This may attract the crocodiles towards it.

Another threat is noticeable outstanding to the human crocodile conflict (HCC). The HCC is probably as old as the human race. An evident from the National Geographic News which was published on February 25, 2010, reports a fossil evidence of hominid bones with crocodiles bite marks. The Great Chronicle of Sri Lanka, the *Mahavamsa* also reports of crocodile attacks in Sri Lanka.

When a crocodile attacks a person, invariably the crocodiles inhabiting in the particular habitat are killed by the victims' relatives or friends in retaliation outstanding to anger and revenge. Mass killing of the salt water crocodiles (*C. porosus*) from Matara, Nilwala River was being reported on May 2012. As there were few human losses due to *C. porosus* attacks, a highly systematic insecticide, known as Carbofuran was being used for poisoning the crocodiles by the angered relatives and friends. Heavy doses of the insecticide had been injected into chicken's flesh and tossed these into the river. Five lifeless crocodiles had been found floating on the river due to the poisoning after two days.

The countries inland Fishery industry creates an additional threat for crocodiles. Adults, hatchlings and juveniles of crocodiles routinely traps on fishing nets and leads to death (de Silva, 2013).

Additionally the eggs and the hatchlings of both crocodile species (*C. porosus* and *C. palustris*) may become vulnerable from natural predators such as varanids (*Varanus bengalensis*, *Varanus salvator*), mongoose (*Herpestes edwardsii*, *Herpestes smithii*, *Herpestes vitticollis*, *Herpestes fuscus*), wild boar (*Sus scrofa*)

and birds such as (*Haliastur indus*, *Pernis ptilorhynchus*, *Accipiter trivirgatus*, *Accipiter virgatus*, *Accipiter badius*, *Elanus caerulescens* etc.).

Outstanding to extensive killing and misplacing its natural habitats, the salt water crocodiles are being categorized as Endangered in 2012 National Red List (MOE, 2012).

Background

The present incident was the first known case of a wild crocodile which got electrocuted and died (Figure 1) in Sri Lanka. It was also a chief study of analyzing the stomach of an electrocuted crocodile in Sri Lanka. This incident concerned as an act of human irresponsibility during construction of the Colombo-Katunayake highway.

In April 2013, an adult early gravid female saltwater crocodile (total length 267 ½ cm) (Figure 1) was observed in an anthropogenic habitat in a small road side stream at Appuge Waththa, Enderamulla (Western province, Sri Lanka). The crocodile while catching bird had accidentally come into contact with a live high-tension electric wire which was tumbled across the stream, thus getting electrocuted and died.

Subsequently the dead crocodile was transported to the Faculty of Applied Sciences, University of Sri Jayewardenepura, Nugegoda Sri Lanka, with the authorization of Department of Wildlife Conservation and kept in a deep freezer for the veterinary session of the World Crocodile Conference (22nd Working Meeting of the Crocodile Specialist Group) in May 19th 2013 which was conducted by Dr. Cathay Shilton.



FIGURE 1: Dead female saltwater crocodile

After the investigations the specimen was stuffed and exhibited in the museum of University of Sri Jayewardenepura.

METHODOLOGY

The following measurements were being taken instantaneously when the crocodile was brought to the University premises. The Details of the measurements are given in table 1.

The lengths were being measured to the nearest 0.1cm by a measuring tape and the eye diameter was being taken to the nearest 0.001cm by a dial caliper. The body mass was being measured to the nearest 0.1kg by a spring scale.

The external parasites were being investigated on the body surface by a hand lens.

Finally the surgical procedures were being carried out to reach to the stomach by placing a ventrally abdomen cut. The skin and the muscles of the stomach area were incised and carefully the stomach was taken out from the abdomen cavity by separating it from the esophagus and the intestine (Figure 2). Formerly it was weighted to the nearest 0.1kg by a spring scale. The stomach contents were being taken out and identified by dissecting the tissues of the stomach. The stomach contents were being measured to the nearest 0.01kg by a digital scale.



FIGURE 2: Stomach of the crocodile

RESULTS & DISCUSSION

Some of above measurements are in consistent with previous morphometric studies of crocodylians (Webb and Messel 1978; Montague 1984; Hutton 1987a; Hall and Portier 1994).

Table 01. Measurements of the lengths.

Measurements	Value (cm)
Total length	267.5
Snout vent length	173.5
Horizontal diameter of the orbit	3.528
Head length	27.5
Head depth	10.5
Head width	15.5
Snout length	37.0
Snout width	17.5
Dorsal cranial length	36.0
Cranial width	27.5
Upper arm length	30.0
Lower arm length	13.0
Femur length	21.0
Tibia length	32.0
Tail length	131.0

There was no evidence of external parasites on the body of the crocodile.

Stomach contents

Partially digested animal fragments (listed below) and one polythene sack which contained chicken limbs and chicken feathers (Figure 3) was inside the stomach.

1. Fish bones (*Oreochromis sp.*) - 0.10kg
2. Skeleton parts of a small mammal (*Bandicota sp.*) - 0.15kg
3. One polythene sack with 2 limbs of an adult chicken and chicken feathers (Figure 3) - 0.65kg
4. Few carapace parts of black turtle (*Melanochelys trijuga thermalis*) (Figure 4) - 0.20kg
5. Stones, sand and clay - 0.30kg
6. Some plant materials (Leafs) - <0.10kg
7. Stomach solution - <0.10kg

C. porosus can leap up to 4 – 5 feet above the surface of the water (Devapiya, W.S., 1998). Eye witnesses indicate that in the present scenario the crocodile had leapt out of the water

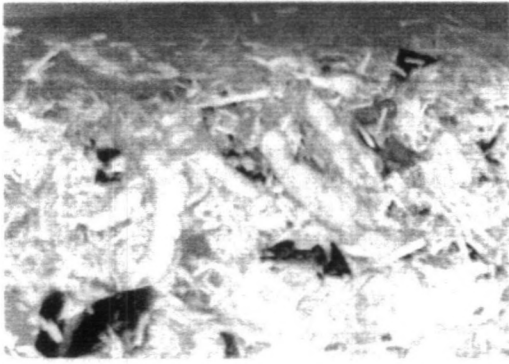


FIGURE 3: Sack which contained chicken remnants

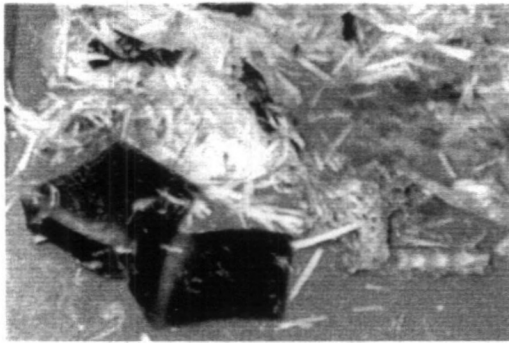


FIGURE 4: Parts of *Melanochelys trijuga thermalis*

to catch a bird perched on the live high-tension electric wire which had led to its death. The electric wires were inaccurately paced on that area due to the constructions of the Katunayake Colombo Express Way (KCEW). If the humans had taken appropriate action this unfortunate incident could have been avoided. The location was a small water stream ill-suited for a large crocodile situated near to an area of dense human population.

The KCEW was built across the Muthurajawela marsh which resulted in fragmenting the habitat. Crocodile populations in these fragmented habitats were forced to find alternative food resources. The situation was further worsened by the careless garbage disposal by humans who routinely use the adjacent streams and canals to dispose garbage. The observation of polythene sack containing chicken offal in the stomach of the crocodile confirms that they have adapted to feed on the garbage disposed by the humans. The foremost problem with

Polythene is that these are not biodegradable. The ingestion of polythene hinders the process of fermentation and mixing of contents leading to indigestion and it also obstruct the orifice between reticulum and omasum of animals (Bhupendra Singh, 2005). Since polythene sacks cannot be digested they may sometimes not pass away through feces of the animal. These sacks may remain in the gut of the animal causing severe pain and even lead the animal to death. When the animal is dead and decay, the sacks are freed and often eaten again by other animals. This creates a circle and may continue for a long period. Irresponsible and inappropriate disposal of polythene in this sensitive marsh may cause severe environmental problems. The Human Crocodile Conflict (HCC) in the future which will invariably be disadvantageous to the crocodiles. It would also be helpful if laws and regulations are introduced regarding the improper polythene waste disposal in to aquatic systems as they have a massive impact on the aquatic organisms in Sri Lanka.

It would be prudent to block the path ways (cannels / streams) which the crocodiles can use to migrate towards the urban areas by placing Crocodile fences. If a crocodile is observed in a water body located in an urbanized area introducing warning sign boards and educating people about the importance of crocodiles to aquatic ecosystems may reduce the HCC. However, ultimately the crocodile will have to be relocated.

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REFERENCES

- Ceylon Today | Five poisoned crocodiles found. Retrieved July 14, 2015.
- Daily news | reduce, reuse and recycle plastic perils. Retrieved July 14, 2015.
- De Silva, Anslém. (2008). The status of the Saltwater crocodile (*Crocodylus porosus*) inhabiting the Nilwala River, Matara District and its impact on the community IUCN/WWF/American Red Cross Partnership 34 Pages.
- De Silva, Anslém. (2010). *Crocodiles of Sri Lanka; Preliminary Assessment of their Status and the Human Crocodile Conflict Situation*. Mohamed Bin Zeyed Species Conservation Fund. Printed at AMP Print Shop, Gampola. 49 p.
- De Silva, Anslém. (2011). Prevention of crocodile attacks in Sri Lanka: some traditional methods. *Crocodile Specialist Group Newsletter*. **30(1)**:28-31
- De Silva Anslém, P. de Silva, D.M. Nayana and K. Dawundasekara. Crocodile attacks in Sri Lanka (2013). World Crocodile Conference, 22nd Working Meeting of the IUCN SSC Crocodile Specialist Group, p 227-233
- De Silva, Anslém. (2013). *The Crocodiles of Sri Lanka (Including Archaeology, History, Folklore, Traditional Medicine, Human-Crocodile Conflict and a Bibliography of the Literature on Crocodiles of Sri Lanka)*. Published by the Author. Printed at AMP Print Shop, Gampola, 254 pp + 72 plates. ISBN: 978-955-52061-1-2.
- Deraniyagala, P.E.P. (1930). The Crocodiles of Ceylon. *Spolia Zeylanica*.
- Deraniyagala, P.E.P. (1939). The trapod reptiles of Ceylon. Vol.1. Testudines and Crocodiles. Colombo Museum Natural History
- Devapriya, W.S. (1998/1999). Abundance and present status of Saltwater crocodiles (*Crocodylus porosus*) in Muthurajawela marsh. Certificate in Wildlife Conservation & Management Open University of Sri Lanka. Nawala.
- Ishara, J. (2015, March 19). daily news | reduce, reuse and recycle plastic perils. Retrieved July 14, 2015.
- MOE (2012). The National Red List 2012 of Sri Lanka; Conservation Status of the Fauna and Flora. Ministry of Environment, Colombo, Sri Lanka. viii + 476pp
- Senn, A. (2012, May 1). Ceylon Today | Five poisoned crocodiles found. Retrieved July 14, 2015.
- Wickramasinghe, D.P. (2001). *Maga digata janakatha 2*. (=folk stories) Sooriya Publishers, Colombo. ISBN 955-8425-22-2

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