

Human-monkey (*Macaca sinica*) conflict in Sri Lanka: A narrative review

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Abstract - With the deforestation, human population growth and expansion of various rural development projects, the incidence of human- monkey conflict is being increased. This overview aimed to summarize the findings of the projects (published and unpublished) carried out relating to different aspects of this human- red faced monkey (toque macaques/*Macaca sinica*) conflict from the year 2000 to 2016 by Veterinary Teaching Hospital, University Of Peradeniya. Mostly Individual monkeys and individual mothers with kids and secondly the troupes caused such trouble in Kandy municipal city limits. Red faced monkeys are attracted to human food, home garden produce and insects found in and around human dwellings. These monkeys, in addition, carry some enteric pathogens which have zoonotic potential. Different methods to control this conflict were tested such as capturing, sterilizing and translocating or rehabilitating and use of repelling devices to change monkeys' trails. However, the impact of performing castration, and ovario hysterectomy only on a proportion of males or/and females in a troop, on reducing their numbers is questionable. It is also understood that the attention in this regard must be paid towards proper and complete monkey proof garbage disposal systems.

Keywords- Toque macaques, *Macaca sinica*, monkeys, humans, conflict, Sri Lanka

I. INTRODUCTION

The main reasons for increased incidence of human – monkey conflict in Sri Lanka are deforestation, human population growth and expansion of various rural development projects (Nahallage *et al.*, 2008). In the year 2000, several written requests reached the Veterinary Teaching Hospital (VTH), University of Peradeniya (UOP) regarding the problem of red faced monkeys (toque macaques/ *Macaca sinica*) becoming trouble makers to daily life of several groups of individuals, shops, schools and places of worship. Thereafter several projects were carried out to study the extent of the problem, control measures, enteric pathogens harbored by these monkeys. In addition the educational programmes among school children were also conducted with regard to human- monkey conflict.

Therefore this narrative overview aimed to summarize and analyze the findings of the projects (published and unpublished) carried out relating to this human- monkey conflict from the year 2000 to 2016 by VTH, UOP.

II. EXTENT OF THE CONFLICT

In order to examine the extent of the Human-toque macaques (*Macaca sinica*) conflict in the year 2000, the Veterinary Teaching Hospital (VTH) launched a project through Postgraduate Institute of Science (PGIS) of University of Peradeniya. This study within Kandy Municipal limits showed that there were two types of monkeys involved. Firstly, individual monkeys or individual mothers with kids. Secondly, the troupes. These monkeys had been possibly tamed and later released or had been used in circuses to perform various acrobatic actions by people to make a living (Wijesinghe *et al.*, 2005).

The monkeys are attracted to tastier human food and once attracted, they stay around and increase their rate of breeding. According to the villagers, it was clear that the monkey threat has got worse during the past 15 years. The monkeys appear to dislike arecanut trees and certain types of banana trees while they eat or destroy all other home garden produce (Jayalath, 2011). Nonetheless, monkeys eat not only plant material, but also insects that are found in and around human dwellings such as those under the roofs. This could also be one of the reasons for monkeys to largely live in the periphery of the jungles where people inhabit. Though, it appears that largely red faced monkeys (*Macaca sinica*) are reported to be the problem, the behavior of different species of monkeys could be different in this regard (Binduhewa *et al.*, 2005).

In 2012 in Kandy city limits, several monkeys were either found dead or were found ill. The VTH was contacted by the Police in Kandy and some such ill and dead monkeys were brought. After treating the affected monkeys and performing postmortems on the dead, it was found that they had possibly consumed a poison. Though this purposeful poisoning was public news in daily newspapers, only the Police and the VTH got involved in solving it. Another situation worthwhile mentioning is that in mid-

2014, monkeys at Udawattakele wildlife protected area in Kandy, appeared to succumb to possibly a viral condition in which they became ill and lethargic and few of them died. According to the people living in the area, this is an annual condition and resolves on its own in about 2 weeks.

III. COPROLOGIC SURVEY AMONG RED FACED MONKEYS- ENTERIC PATHOGENS WITH ZONOTIC POTENTIAL

In the year 2015, a coprologic survey (Mendis, 2016) on enteric parasites, selected bacteria and viruses with zoonotic potential in red faced monkeys (toque macaques/*Macaca sinica*) using 105 samples from Kandy area was performed. In that study, 4 types of protozoan cysts: *Entamoeba coli*, *Entamoeba histolytica/dispar*, *Giardia* spp. and *Balantidium coli*, 4 types of helminth eggs: strongyle type/ *Strongyloides* spp., *Trichuris* spp., *Enterobius* spp. and *Bertiella* spp. and *Shigella* sp. were found. Some parasites were found more often from monkeys from areas with close contact with humans. This is another aspect of human- monkey conflict that has not gained much attention.

IV. CONTROL MEASURES FOR THE CONFLICT

In 2005, all trouble making individual monkeys within municipal limits in Kandy were caught using different methods; trapped and/or sedated (Wijesinghe *et al.*, 2005). These monkeys, after capturing, were surgically castrated or ovario- hysterectomised, vaccinated against rabies and tetanus and introduced into a special cage complex. This cage complex had 8 individual cages into which the monkeys were introduced and a common corridor. The monkeys caught as above, lived in this cage complex for 6 months. One monkey at a time, was released into the common corridor in the cage complex, made contacts with others and established hierarchy. At the end of the period, they were all in one troop together, established the hierarchy and hence were released to the wild (Rupasinghe, 2006). This troop however, was not subsequently monitored.

The surgical techniques of castration, and ovario hysterectomy were mastered by several veterinary surgeons. In addition castration of male monkeys, not surgically but by injecting formalin into testicles and using human intra uterine loops on female monkeys in order to control their breeding was also attempted with some success though the work was inconclusive and is of preliminary nature (Samal *et al.*, 2015). Issues on ethics and specially of pain were some problems that had to be dealt with. However, the impact of performing such techniques only on a proportion of males or/and females in a troop, on reducing their numbers is questionable since females mate not only with the alpha male.

Later, a village in Hali-ela area was interested in settling the human-monkey conflict and as a result, several meetings with the village men and women were held. Most such meetings were held in the Buddhist temples in the area to make the people understand that all these attempts were not to kill, destroy or to develop hatred towards monkeys but to co inhabit. It was pointed out in such meetings that the most feasible among the few temporary solutions was to, capture, surgically sterilize, vaccinate and to release either to the same location or to translocate. The carpenters in this village were advised to build community monkey traps. The women were advised to feed the monkeys once trapped until the surgery was performed and until they were released back to the wild. One person was employed to operate the trap (Wijesinghe *et al.*, 2009). They were also made to understand that the welfare and the genetic make-up of these monkeys must be looked into. This program with the assistance of the Department of Wildlife Conservation subsequently became popular in other areas of the country.

Thereafter, a village level monkey trapping program was conducted in Kandy from which a substantial proportions of animals from several troupes in the area were caught, surgically operated and were translocated (Jayalath, 2011). However, the monkeys from the surrounding areas started gradually entering into the village vacated by the monkeys, in about 6-7 months. These new monkeys gradually started to be destructive and were after some time, behaving almost as same as the ones that were translocated (Jayalath and Dangolla, 2011).

The University of Peradeniya in early 2014, funded importation of 5 monkey repelling electrically operated electronic devices from India which emit monkey repelling sound waves. These instruments were fitted on pre-determined strategic points within the university premises after a detailed study of troops and their trails in the area. This study showed clearly that the monkeys would not change their trails or would not be disturbed by these equipment. In addition, these devices were producing noises that were disturbingly audible for people (Personnel communication).

Applying luminous paint with various colors on monkeys to make other monkeys scared, making the monkeys eat hot chilies and clipping their hair were studied as remedial measures all of which the responses were temporary and transient. During 2012, that the "horoscope approach" came into lime light. It was commonly said that in Ukuwela, Matale, a certain agricultural land was never attacked by monkeys while all other lands around were inhabited and destroyed by them. The reason indicated was that the construction of the fence of this particular land had been

done on an auspicious time according to the fortune of the owner of the land. It was also pointed out that, if a construction is done according to such a time, animals will not inhabit. A certain Buddha statue in southern Sri Lanka, on which birds do not rest, is also said to be non inhabited by birds because the architect used such an auspicious time to start construction. There is also a belief that hanging a fresh goat skin along the monkey trail would repel them though this has not been studied.

Attention in ending this human- monkey conflict must be paid towards proper and complete monkey proof garbage disposal. A special monkey proof waste bin has been introduced in Polonnaruwa area as a solution to the conflict. However, most inhabitants throw garbage from a distance into a bin and do not make an effort to properly dispose. To use a monkey proof waste bin, people must take an effort to dispose their own waste.

V. EDUCATIONAL PROGRAMMES AMONG SCHOOL CHILDREN

Several children from different schools in Kandy were used at different points of the study on human-monkey conflict resolution to make observations and to make them understand that a real life problem needs pooling knowledge from various disciplines; i.e. a multi disciplinary approach. In addition, this project was also used to examine the use of “hypothesis testing” lesson in the GCE A/L school syllabus in Science curriculum at that time (Rupasinghe and Dangolla, 2005).

The VTH thereafter, conducted an initial island-wide survey with several educational programs in different parts of the country regarding the human-monkey conflict. The children in the GCE advanced levels Science stream were also used in these programs (Rupasinghe, 2006). These educational programs and subsequent investigations included teachings on potential zoonotic infections that could be transmitted to humans from monkeys. The school children appeared to learn these principals faster than expected (Wijesinghe *et al.*, 2003).

VI. CONCLUSION

A survey on the international literature on the monkey human conflict, clearly show that there is no permanent solution except proper and responsible garbage disposal. However, in agricultural areas in Sri Lanka this recommendation may not work. None of the different approaches adopted in India, Thailand or Malaysia have shown fruitful results in this regard. Resolving this problem in cities and agricultural areas, while appreciating the living rights, welfare and genetic issues of both humans and monkeys is urgently needed. It is timely that the Kandy

municipality takes lead attempting to solve this problem, examine the potential benefits and losses of the proposed solutions and make decision on mass scale introduction and adoption of a remedy to ensure decent living standard for people within municipal limits.

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