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Cover: Long-tailed Shrike *Lanius schach* resting on a dry branch after courtship. Digital illustration on Procreate. © Aakanksha Komanduri.



A preliminary study to investigate behavioural differences among elephants residing near the Buttala-Kataragama and Habarana roads in Sri Lanka, where they are regularly fed by passing motorists

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Abstract: This study examined the behavior of wild Sri Lankan Elephants *Elephas maximus* living in districts near Buttala-Katragama road (B035) and Habarana road (A11). Elephants at B035 were observed to be more attracted to food given by motorists than those at A11, who were more interested in feeding on surrounding vegetation, strolling, and crossing the road. Motorists travelling the B035 route were also observed to be more likely to feed elephants than those travelling the A11 route, despite the latter having the most traffic.

Keywords: Asian Elephants, behavioural plasticity, conservation, Elephant cognition, Elephants' food solicitation, ethology, road ecology, Sri Lanka, wildlife-human negative interaction.

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Author details: Tharindu Muthukumarana is a zoologist specialising in elephant research. He is the author of the award-winning book *The Life of the Last Proboscideans: Elephants*. He also founded the Elephant Conservation Organization, dedicated to advancing research and promoting science-based elephant conservation.

INTRODUCTION

Wild elephants showing an interest in food given by humans is not new (Muthukumarana 2017). In Sri Lanka, places have been identified where some elephants could be said to be “addicted” to getting food directly from people travelling through the area. These places include Somawathiya, Sithulpawwa, Udawalawe, Buttala-Katragama road, Habarana road, and Kegaliththa in Yala Block IV. Of these, the Buttala-Katragama road (B035) and Habarana road (A11) are significant since both cut through protected forest patches. The Buttala-Katragama road goes through Yala National Park-Blocks III, IV, and V, the latter connecting with Lunugamwehera National Park, which connects with Vetahirakanda Nature Reserve and thereby Udawalawe National Park. The Habarana road runs adjacent to Minneriya National Park and a jungle corridor that connects to Kaudulla National Park (Image 1).

On either side of these two roads, sign boards have been erected informing travelers of the presence of elephants and advising not to feed them. Both roads are heavily used by motorists, and incidents have been reported when vehicles have collided with elephants, and when elephants are said to have attacked motorists. In Buttala-Katragama road, elephants have been reported to take food by force by blocking the road and using their trunks to grab food from inside vehicles. This act may damage the vehicle but the animals do not seem to intentionally attack the passengers.

Study objective

To identify which population of elephants is more “addicted” to human-provided snacks. Features of “snack addicts” include:

1. They linger near or on the road for long periods of time, extending to several hours.
2. They show little interest in feeding on nearby vegetation.
3. They show considerable interest in passing vehicles, with responses including approaching them and lifting their trunk next to windows to accept food.

There were previous reports that elephants on Buttala-Katragama (BK) road are more interested in buses than other vehicles, since they are more confident in getting food from riders therein. Thus, one aim of this study was to examine this aspect. Another goal was to check whether musth periods were associated with aggressive responses to motorists.

Evaluation

Records come from the years 2013–2019, during which a survey recorded 203 elephant encounters on BK Road, and 145 in Habarana. When an elephant or a group of elephants was sighted, their behaviour was assessed against the ethogram and related criteria, and the relevant data were documented. Each sighting was classified as a “case,” with observation duration varying according to the elephants’ proximity and visibility. The mean observation time per case was 97.5 ± 82.5 minutes on BK and 70 ± 60 minutes (113 days) on Habarana (109 days). Twenty-seven behavioural criteria were checked for both the populations (Table 1 & 2), and observations also indicated more traffic on Habarana road relative to BK road. Recent observations seem to indicate a similar behaviour pattern.

Additionally, traffic was monitored for 20 days on both the BK and Habarana roads. Specifically, the number of vehicles passing per minute was recorded. The mean traffic values were then calculated separately for each road (Tables 1 and 2).

Buttala-Katragama elephants’ analytical data

From the behaviour criteria, the behaviour that was observed the most was “Staying on the middle of road for long times”. In all the other sightings, except in one herd, elephants had an interest in staying on the road. But herds seem to prefer staying off the road compared to the individual males. This also clarifies that most of the “addicts” were males. It is also remarkable that bachelor herds were absent, and male elephants that were within a range of 55 m were not cooperative with each other for a long time.

In the few herds observed, the number of individuals ranged from 2–5 individuals. Per herd there were at least one each of the following: infant, juvenile, and sub-adult. The adult number ranged from 1–2 individuals. These were basically small herds and since the research was based upon sightings, sometimes the same herd might get counted on different occasions.

Out of the elephants that exhibited aggression towards motorists, only one of them was in musth condition. None of the members in any herd showed any signs of aggression.

The types of vehicles that gave food were (in descending order): van $n = 80$, three-wheeler $n = 56$, car $n = 54$, bus $n = 51$, truck or lorry $n = 33$, SUV $n = 25$, motorcycle $n = 9$, cab $n = 8$ and tractor $n = 1$. However, it was remarkable to notice that out of the four incidents of force grabbing, three were from buses, while only one was from a three-wheeler. It should be mentioned

Table 1. Behavioural criteria noted at Buttala-Katragama.

Cases / Incidents	n
Shows any nervous feelings towards vehicles (tries to flee away from the motorists)	10
Any signs of aggression towards vehicles (try to mock attack the motorists)	9
Interested in feeding on surrounding vegetation	16
Staying in the middle of the road for long times	174
Shows any aggression towards any other male elephants	3
Herds (Adult-female/may have a juvenile or infant male)	6
Adult male	197
Juvenile (male)	1
Sub-adult (male)	48
Number of elephants exhibiting temporal gland secretion	9
People getting out of the vehicle (to give food/watch or photograph)	25
Engagement of nearby resources such as water	1
Elephants staying at side of the road but people are feeding them	3
Elephants taking food by force	4
Number of times when another elephant was present within a radius of approximately 55 m	12
Interested in strolling along the road	6
Number of times when herds were detected to beg for food from the motorists	5
Total number of vehicles that gave food to elephants	115
Average number of vehicles passed an elephant per 1 min	2.56338

that those buses were filled with passengers going on a pilgrimage. The three-wheeler incident happened to a foreigner who had rented a three-wheeler and was passing by that road.

Habarana elephants' analytical data

From the behaviour criteria, the behaviour that were observed the most were "Interested in Strolling Along the Road", "Interested in Feeding on Surrounding Vegetation", and "Crossing the Road and Entering Forest (without strolling)".

All the elephants that were interested in strolling along the road were male elephants. In this behaviour, they may stroll along the road and enter to the side of the forest. Sometimes they strolled more than 1 km in distance.

Out of the 26 herds that were encountered during the course of the study, about 22 herds were interested in feeding on the surrounding vegetation. This vegetation is the flora present at road side, basically 15 m away from the road. About 17 herds crossed the road without strolling. The remaining nine herds may have crossed before the encounter. There were two bachelor herds

that quickly crossed the road.

The number of herd members ranged 3–70 individuals per herd, including multiple herds getting together to form a kinship herd. Usually in a herd, there would be less than 15 individuals, so having a greater number than that means these are likely kinship herds (Prasad 2004). Per herd the infant number ranged from 1–15 individuals, while juveniles ranged 1–26, sub-adults 1–17, and adults 1–12. There was one kinship herd with two adult males.

Out of the elephants that exhibited aggression towards motorists, not a single musth elephant belonged to that criterion. About four herds did exhibit aggression towards the motorists.

The types of vehicles that gave food were (in descending order): car n = 3 and bus n = 1.

DISCUSSION

The bulk of begging elephants' diet is not the food they get from humans along the road. Those foods are morsels that they have a special interest in. The foods that were given consists of fruits, vegetables, baked goods and sweetmeats. This preliminary study shows that the elephants at the BK are the most "addicted" ones when compared with the Habarana population. This fact is clearly proven since the majority of elephants at BK were interested in standing on the road pathway for a long period of time. Unlike the Habarana elephants, the elephants at BK did not show much interest in strolling along the road, feeding on surrounding vegetation, or even crossing the road without strolling. The motorists travelling through the BK road were the ones that were more interested in giving food to elephants when compared with Habarana.

In BK, the motorists from vans, three wheelers, cars, buses, and truck or lorry were the ones that fed elephants. Though it was known by some that elephants at BK showed a special interest in buses rather than other vehicles, yet motorists from vans, three wheelers, and cars gave more food to the elephants. Despite that, it is concerning that forced grabbing of food was mostly on buses. A probable hypothesis could be that since all the buses subjected to force grabbing are pilgrimage buses, those buses are usually filled with lots of snacks. Due to the fact that elephants possess a remarkably strong olfactory sense, they may be able to detect it (Bates et al. 2007; Plotnik et al. 2019). That could trigger them to grab the food. If not, perhaps it could be due to elephants' high cognition capabilities; they might have

learnt that they get more food from buses, so targeting buses would be more beneficial and promising.

There wasn't much relationship between aggression and the musth period of the elephants. In BK even the small rate of aggression shown from one elephant towards another elephant was mainly because of dominance while getting snacks from the motorists. From the rate of aggression shown to motorists, about five of the motorists behaved in a risky manner near the presence of the elephants. This means either the passengers got out from the vehicle or the vehicle drove closely to the elephant. In one case a motorist provoked the elephants to exhibit aggressive signs. In that particular incident, the elephant was standing at the roadside feeding on vegetation when a vehicle approached. The occupants lowered the window and began shouting at the animal. In response, the elephant performed a mock charge as a defensive reaction. It did not damage the vehicle or injure any passengers. Nevertheless, such reckless human behaviour could easily have resulted in a tragic outcome.

In BK there were nearly 20 individual male elephants that followed the habit of begging. Some are frequently engaged in this behaviour while others only do it occasionally. From the earliest times until today there is one bull elephant in his prime with a broken tail that is more frequently seen begging for food. This elephant, named "Buttala Raja", is more placid towards the motorists, but sometimes exhibits aggression towards

Table 2. Behavioural criteria noted at Habarana.

Cases / Incidents	n
Shows any nervous feelings towards vehicles (tries to flee away from the motorists)	1
Any signs of aggression towards vehicles (try to mock attack the motorists)	10
Interested in feeding on surrounding vegetation	73
Staying in the middle of the road for long times	2
Herds (adult females /may have a juvenile or infant male/with kinship herds)	26
Adult male	133
Sub-adult (male)	11
Number of elephants exhibiting temporal gland secretion	8
People getting out of the vehicle (to give food/watch or photograph)	12
Engagement of nearby resources such as water	5
Elephants staying at side of the road but people are feeding them	2
Number of times when another elephant was present within a radius of approximately 55 m	4
Interested in strolling along the road	93
Kinship herds	2
Quickly crossing the road & entering forest (without strolling)	27
Locals feeding elephants	1
Males testing strength in the middle of the road	1
Bachelor herd	4
Bachelor herd (only two together)	3
Standing behind an electric fence or high slope	7
Total number of vehicles that gave food to elephants	4
Average number of vehicles passed an elephant per 1 min	10.333



Image 1. A bull elephant crossing the road in Habarana. © Tharindu Muthukumarana.

other male elephants over food given by motorists. In Yala NP there is a young elephant named “Gemunu” that has a habit of forcibly stopping safari vehicles and getting food from them for consumption. But generally, “Buttala Raja” did not exhibit such behaviour. During the curfew time due to the Covid-19 pandemic, “Buttala Raja” was not seen on the road as much but was frequently spotted at the Wildlife office near the Galge entrance. This was mainly due to the deserted road. In the same time period elephants did cross the Habarana road as usual. Yet almost every minute a vehicle passed. This situation indicates that the Habarana road carries heavier traffic than the BK road, which may partly explain the higher mortality from elephant–vehicle collisions reported in Habarana compared to BK. Although elephants along BK display stronger food-soliciting behaviour and often remain in the middle of the road for prolonged periods, the Habarana population is at greater risk of being struck by vehicles due to the higher traffic volume (Department of Wildlife Conservation 2018).

Some motorists that travel on the BK road take some food with the aim of giving it to an elephant. A main reason for this to happen is that certain people believe that if food is not given to the elephants, they may not let the motorists pass. In Yala Block IV there is a religious site with a tamarind tree called Kebiliththa Devalya. In here a lot of offerings are made to the Kataragama God. Because of these activities a wild male elephant named “Madhu” comes to this site frequently with the aim of getting fed by the pilgrims.

CONCLUSION

In Habarana, more than a decade ago there was a young male elephant that was “addicted” to food given by the motorists. Just like the BK elephants, this elephant would stay on the road and approach motorists with the aim of getting food from them. This elephant was frequently seen near a road-side shop. Motorists even used to stop near this shop and buy foods for

this elephant. Later this elephant was translocated to another place by the wildlife officers. Relative to this study, this incident leaves us with the question that “if this young elephant wasn’t translocated, would there have been more young male elephants that would have followed the begging pattern of the initial elephant?”

Because of a high frequency of traffic and of a higher accident mortality due to vehicle–elephant collisions in Habarana, it would be better to have a strategy to mitigate this issue. Solutions such as building flyovers can be time consuming, and science should be utilized in the building process. As a short-term strategy, ground surveillance to monitor the traffic, something similar to what is done on Kaziranga’s National Highway 37 in India, might have some positive feedback at least for the time being. In more extreme cases speed bumps could be considered.

Since this research shows that some buses that carry pilgrims are vulnerable to force grabbing, it would be better if the respective authorities promoted an alternative route for reaching their destination. This type of action could ease the friction between elephants on the road and the motorists. Moreover, this is a preliminary study, and further research is needed to obtain more details about those elephants.

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