

# Unravelling ceremonial calf burials among Asian elephants in Northeast India

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July 26, 2023

## Abstract

Rampant environmental change and forest destruction push elephants, both Asian and African, to explore human spaces to fulfil their dietary and ecological requirements. Many ‘novel’ elephant behaviour in sharing spaces come to the limelight. Elephant calf burial is reported in African literature but remains absent from the Asian context. We concretely report calf burials by Asian elephants in the eastern Himalayan floodplains of the north Bengal landscape. The study area consists of fragmented forests, tea gardens, agricultural lands, and defence establishments, among others. Tea gardens form the majority of elephant corridors, and we explain the burial strategy of elephants in the trenches of tea gardens. We present four case reports of calf burials by elephants. We aimed to understand the perimortem strategy and postmortem behaviour of Asian elephants. The major findings reflect that the carcasses were carried through trunks and legs for a distance before burying in a ‘legs-upright-position’. We further investigated the underlying reason for calf deaths through postmortem examinations. Direct human intervention was not recorded in any of the four deaths. Through opportunistic observation, digital photography and fieldnotes, and postmortem examination report, we suggest that the carcasses were buried in an abnormal recumbent style irrespective of the reason for calf deaths. Through long-term observation, we further report that the elephants in this region clearly avoid the paths where carcasses were buried, attributing to “bad milestones” and “bad omens”. We discuss and connect the literature of two distinct elephant species and also compared thanatological studies of other sentient nonhuman species. Keywords: Thanatology, animal behaviour, Asian elephant, calf burial, eastern Himalayas, tea gardens

Title: Unravelling ceremonial calf burials among Asian elephants in Northeast India

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## Abstract

Rampant environmental change and forest destruction push elephants, both Asian and African, to explore human spaces to fulfil their dietary and ecological requirements. Many ‘novel’ elephant behaviour in sharing spaces come to the limelight. Elephant calf burial is reported in African literature but remains absent from the Asian context. We concretely report calf burials by Asian elephants in the eastern Himalayan floodplains of the north Bengal landscape. The study area consists of fragmented forests, tea gardens, agricultural lands, and defence establishments, among others. Tea gardens form the majority of elephant

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To 24/July/2023

The Editor-in-Chief,

Ecology and Evolution

John Wiley and Sons

Subject: Submission of Manuscript

Dear Professor,

I wish to submit a manuscript titled “**Unravelling ceremonial calf burials among Asian elephants in Northeast India**” to your esteemed journal for publication. Our manuscript presents four case reports of elephant calf burials by herd members in the North Bengal landscape of India. The pre-built trenches in tea gardens provide appropriate space for burying the carcasses. The ‘calf burial’ behaviour has been scarcely studied among African elephants and has not been reported concretely from Asia. We aimed to understand the perimortem strategy and postmortem behaviour of Asian elephants. The major findings reflect that the carcasses were carried through trunks and legs for a distance before being buried in a ‘legs-upright-position’ – showing the adaptive significance and sentient behavioural patterns. To further understand if these deaths would trigger human-elephant conflict in the region, we investigated the underlying reason for calf deaths through postmortem examinations and triangulated the findings through long-term observation. We report that the elephants in this region avoid the paths where carcasses were buried, attributing to “bad milestones” and “bad omens”.

This thanatological work is novel and highlights the evolutionary process compared to African elephants and primates. Neither this research work nor any part of this research has been published or submitted elsewhere for possible publication. I will greatly appreciate a constructive manuscript review with comments and suggestions.

Yours sincerely

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*Introduction*

Human-induced rapid environmental change often alters nonhuman species' reproductive, nutritional, and physiological behaviour (Cosmides and Tooby 2000; Chartier et al. 2011; Sih et al. 2011). Both Asian (*Elephas maximus*) and African (*Loxodonta africana*) elephants face land-use challenges more than other species due to their substantial dietary requirement and extensive home range (Young et al. 2007; Kshetry et al. 2020; Roy et al. 2022). Known for their strategic planning and cooperation, these social animals also become victims of environmental modifications, and the resultant low fertility and high calf mortality rates emerge as noted unforeseen consequences (Mar et al. 2012). Realizing the slow reproductive rate in elephants (Macdonald et al. 2013), calf deaths directly influence their population dynamics. While these sentient megaherbivores constantly adapt to land-use and environmental change to increase survival rates, they demonstrate various novel behaviours. Conversely, in order to survive many such behaviour, of their affection for their offspring, comes to the limelight when they frequently use the human domain than before. One such behaviour is how they farewell their deceased calves and the herd behaviour thereafter.

The manner in which nonhumans address the dying and the dead reflects their cognition and emotional side (Hawley et al. 2016; Watson and Matsuzawa 2018; Carter et al. 2020; Fernández-fueyo et al. 2021). Animal behaviour and thanatology, therefore, remain a central part of understanding the overall fitness of nonhuman species in a changing landscape (Gill et al. 2020). Most animal species, unlike humans, pay less interest to their dead conspecifics. Different species' 'weak' cognitive abilities and disease avoidance theories support this 'leaving alone' behaviour (Goldenberg & Wittemyer, 2019). However, cetaceans, primates, and elephants show contrasting examples of strong behavioural reactions to their deceased young ones. While most of such caring behaviour between mother and the offspring among different species are observed (Bercovitch, 2012), notably, the entire herd projects an affectionate behaviour among elephants (Sikes 1971, McComb et al. 2006). With up to 22 months of gestation, these K-strategist species invest a lot of emotional energy in their young ones, even after their demise.

For instance, a behaviour where the elephant carcass parts were carried across a distance, covering the carcass with vegetation ("weak" burial), or observing the carcass over several hours has been covered in various scholarships concerning African elephants (Douglas-Hamilton and Douglas-Hamilton 1975; Goldenberg & Wittemyer, 2019). Apart from elephants, burial behaviour has been observed in termites (*Reticulitermes fukienensis*) (Fernández-fueyo et al. 2021) but in no other large mammals. Calf burials by elephants are among the less-studied topics of thanatology, especially in Asia (Sharma et al. 2019), even though this practice is known to the conservation gatekeepers. Elephants show a variety of behaviour ranging from investigative, stationary, self-directed, social, and mourning behaviour around their dead conspecific (Hawley et al. 2016; Goldenberg and Wittemyer 2019; Watts 2019; Stephan et al. 2020).

Even though such sensory behaviours have been vastly studied, most of these scholarships fail to report the exact cause of calf deaths and weakly contribute to animal thanatology. The cause of death remains a salient mediator to individual responsivity (Bercovitch 2020). We deem it urgent as the herd's behaviour (especially the mother) would vary in deaths due to natural illness and accidents (injury and wounding). Calves up to five years of age experience mortality risks due to various factors such as maternal age, sex of the calf, inter-birth intervals, and whether firstborn or later-born (Mar et al. 2012; Rutherford and Murray 2020). Controlled studies have reported 43.3% of deaths due to accidents among young calves (Mar et al. 2012), and therefore, the resultant behaviour remains critical and dependent on the cause of death.

From an evolutionary biology standpoint, natural illness and the consequent death ultimately increase the fitness of the surviving population (Fernández-fueyo et al. 2021). Thus, such an incident of calf death wouldn't escalate the conflict against humans. However, in case of accidental deaths (attributed to humans), revenge behaviour has been observed across many species, such as elephants (Chalcraft, 2015), primates (Watts 2019), and more recently among orcas (*Orcinus orca*) (Anderson et al. 2016). Retaliation and revenge by elephants escalate the human-elephant conflict (HEC) and pose a severe challenge to wildlife managers and anthropologists. However, various socio-ecological and political factors still determine the magnitude of HEC, but such factors aren't included in this article. This study rather contributes to the ecological behaviour of elephants, both peri and postmortem, while investigating into death cause through postmortem reports of

carcasses and attempting to bridge the two different elephant species and draw commonalities and contrasts between the two as far as thanatology is concerned.

While the elephants occupy only 5% of their historic home range globally, India hosts more than sixty percent of the global Asian elephant population despite being one of the most populated countries in the world (Leimgruber et al. 2003; Sukumar 2006). As much as 78% percent of their current habitat lies outside protected areas (PAs) in heterogenous landscapes (Naha et al. 2020). With ever-increasing human population alongside livestock heads and agricultural land on one hand and conservation efforts to increase the large mammal population on the other hand increases the human-nonhuman overlap (Sukumar 1989; Goswami et al. 2015). The Asian elephant is listed as Endangered on the International Union for Conservation of Nature (IUCN) Red List of threatened species and is regarded as a sentient being for its intelligence. Many novel behaviours come to the limelight when elephants use non-forested areas more frequently. The study's novelty lies in the unique style of ceremonial burial of elephant calves inside tea gardens (TGs) of north Bengal.

Along with a green cover and comparatively undisturbed passage for the pachyderms, the tea gardens also provide ample stretch to trenches for the burial of their deceased conspecifics. The trenches move out excess water during the monsoon season to protect the tea bushes. However, elephants reportedly use these depressions to bury their deceased offspring. This study also presents the first photographic report of dead calf burial by elephants in the tea gardens.

We aimed to (1) study the cause of death for the elephant calves, (2) understand the rationale behind the unique carcass burial strategy, and (3) observe the postmortem behaviour among elephants near the burial sites. We report the underlying reasons, from postmortem examination reports for the calf deaths, anecdotal evidence of herd members during peri and postmortem phases. This study contributes to the existing literature on elephant behaviour and thanatology through a combination of observation, analysis, and interpretation methods.

### *Materials and Methods*

This section presents the study area, methods of data collection and analysis.

#### *Study area*

The north Bengal landscape comprises fragmented forests, tea gardens, tributaries and distributaries, agricultural fields, and defence establishments intersected by railways and highways (Figure 1). While there has been a constant decrease in the wildlife habitat over the last few decades, the four districts of north Bengal, namely – Darjeeling, Kalimpong, Jalpaiguri, and Alipurduar, together host more than five hundred elephants (MoEF & CC Report, 2017). The land-use and landcover analysis highlights a forty four percent increase in human settlements and a seven percent decrease in the sand bed area in the last decade (Naha et al. 2019). Parallely, Roy and Sukumar (2015) identified 59 elephant corridors, while eighty percent of these corridors experience a high degree of encroachment. With shrinking ecological corridors but considerate peoples' tolerance (Roy et al. 2022), the elephant population increases and is 'pushed' through tea gardens, cited as 'natural corridors' in modern human-elephant conflict literature. Exponential increase from 10,000 acres in 1866 to 50,000 acres in 1905, the tea industry has emerged as a static livelihood option to many and welcomed many migrants (Xaxa, 2019). The numbers grew further over the next century and currently covers approximately 1350 km<sup>2</sup> of land (Kshetry et al. 2020).

#### *Data collection*

We triangulated the findings through opportunistic observation, digital photography and fieldnotes, and postmortem examination reports. These are explained below:

#### *Opportunistic observation*

The jurisdiction of wildlife divisions in north Bengal spreads across forest villages, revenue lands, tea gardens, and any other area where wildlife is present. The four discussed case reports originated through opportunistic observation. This method corresponds to spontaneous observation and recording of the behaviour of any

natural event by the researcher or any concerned individual (Altmann, 1974; Carter et al., 2020; Pokharel et al., 2021). The researcher then captures the event through photography, field notes, videography, or audio recording, followed by long-term observation.

### Digital photography and fieldnotes

The researchers took photographs of these burial incidents, forest department officials and the tea garden management, which were later analyzed (Silva et al. 2017; Goldenberg and Wittemyer 2019; Carter et al. 2020). The researchers and tea garden management collected evidence of elephant visitation around the burial site. All the burial sites were far from human settlements, and identifying the particular elephant herd at night was challenging for the locals. However, the researchers and tea garden management regularly monitored the specific pathways while preparing field notes to look for indirect evidence such as dung boli and footsteps.

### Postmortem examination reports

Four veterinary officers conducted the postmortem report in the presence of the forest officers of respective wildlife divisions. The postmortem report of the deceased calves reveals the reason for deaths, underlying illness, health conditions, and various parameters (see Table 1). While other scholarships suspect the cause of calves' death through indirect evidence (Goldenberg and Wittemyer 2019; Sharma et al. 2019), this study gives detailed proof of the cause of death. Also, note that the postmortem examination report reflects the estimated time of death of the calf and deduces the 'in-transit' time and the time under the ground.

### Results

We report four calf burial cases in different tea gardens in the study area (figure 1). We present the findings in two sections, through (1) internal examination through postmortem examination report and (2) external examination and field anecdotes.

Internal examination through postmortem report (see table 1):

External examination and Field anecdotes:

The most contrasting finding of this study is the positioning of elephant carcasses during burial. In all four cases, the legs were upright, and the head, trunk, and dorsal parts were fully buried. Due to the limited depth of the trenches in TGs, the legs of the dead calves were visible above ground level (see Figures 2-5). We observed footsteps of herd members on both sides of the trench and over the soil covering the body, indicating a combined effort in burying the carcasses. While mounting the carcass, the elephant herd vocalized for 30-40 minutes, as the TG night security guards reported. All the cases had minute contextual differences and are mentioned below as four different case reports:

*Case 1* belongs to Devpara TG, which falls in the jurisdiction of the Jalpaiguri division. The burial site's location (26.829477° N, 89.009466° E) was 350 m away from the nearest human settlement and approximately 4 km from the nearest reserve forest. It rained the night of burial, making it easier for the herd (N=20) to mount the carcass. Loud vocalization from the herd was observed distantly. Large petechial haemorrhagic lesions and contusions were found in the dorsal surface of the entire vertebral region (Supplementary Appendix 1). As per long-term observation, the frequency of the elephant movement reduced by up to seventy percent. Elephants have rather started using parallel pathways and clearly avoid the previous path where the carcass was mounted. One of the parallel routes also witnessed a human death in quick succession after the calf mounting. However, such human death incidents could have resulted from other socio-ecological and circumstantial factors. Fresh elephant dung boli of different sizes were also observed near the mounted carcass. The locals worshipped the deceased calf before the forest department officials took it away.

*Case 2* belongs to Chunabhati TG under the Binnaguri range of the Jalpaiguri division. The burial site (26.860416° N, 89.072500° E) was 150 m away from the nearest human settlement and 4.5 km from the nearest forest. Subcutaneous tissues were damaged, and wide haemorrhages were observed on the dorsal side of the body (Supplementary Appendix 2). It rained heavily on the night of the incident, and the soft soil

layer facilitated an easier burial process. No vocalization was reported in this case. Elephant dung boli of various sizes present indirect evidence that the herd (N=15) also consisted of adults, sub-adults, and young adults. Although it's challenging to identify the particular herd at night, but elephants clearly avoid the pathway of the mounted carcass. Now, they take alternate routes to the nearby forest after night grazing.

*Case 3* corresponds to Bharnabari TG under the jurisdiction of the Hamiltonganj range of the Buxa tiger reserve (Supplementary Appendix 3). This burial site (26.764752° N, 89.361850° E) was 300 m from the nearest human settlement. The tea garden management and the villagers observed the unusually prolonged vocalization of an elephant herd (N=15 to 20) during their entire journey inside the TG. This vocalization involved both trumpets and roars. A fracture in the right hind limb was also observed. Long-term observation on this particular pathway reflected that elephants scarcely used this pathway, and the frequency hasn't changed after the burial incident.

This TG was declared 'sick' in 2008 as the company was at a loss and could not fully support the welfare of the tea garden residents. Moreover, the TG was shut down between 2005-08 due to loss and management failure. These socio-economic and political reasons contribute to comparatively less human density in this TG, thus, facilitating easier passage for the elephants. Footsteps of herd members were recorded around the mounting site, and it seemed that the herd had attempted to bury the deceased to ground level.

*Case 4* belongs to Majherdabri TG under the jurisdiction of the East Damanpur range of the Buxa tiger reserve (Supplementary Appendix 4). The burial site's location (26.544368° N, 89.557619° E) was around 500 m away from the nearest human settlement and close to the national highway. The 'partially buried' carcass was observed by the TG workers, which postmortem examination by the forest department followed. As per the postmortem report, the calf died 60-72 hours before the examination. We concretely suggest that the elephant herd must have roamed for 40-45 hours before finding an appropriate trench to bury the carcass; otherwise, it would've been noticed by the TG labours previously.

Conversely, we also report a time lag between the time of death and burial and that the carcass was dragged to the appropriate point. This forest adjoining site allowed the elephants to access the trench and return to the forest. As the carcass was detected after almost three days, the kidneys were partially putrefied. Moreover, there were bruises and contusions on the dorsal side of the carcass – more than that in the other reported cases. Thus, it indicates that the herd carried the carcass through the trunk or the legs for a longer time.

The soil eruptions over the body of the carcass represent that rigor mortis has passed, and the gaseous components blow out of the soil before the carcass was detected. This phenomenon refers to "postmortem flatulence" or colloquially "burial explosion". Rigor mortis among elephants arrive after twelve hours and remain for the next twelve hours.

Similar to other cases, this case was also peculiar as the elephant herd abandoned this active migratory route after mounting the deceased calf. They are reported to use different parallel paths after the incident.

Overall, we also observed contusions, mainly in the neck and dorsal parts along the vertebral column in all the cases. It was accompanied by hemorrhagic fluids in the trunks of most carcasses. Other observations reveal that the mucous membrane was pale and dry, and the tongue was soiled, congested, and inflamed in all cases. The average depth of the trenches was found to be 0.65 m. No body part was missing. Field observation from south Bengal shows carrying behaviour through the trunk and legs (Figure 6).

### Discussion

Environmental change and land-use patterns often bring novel behaviour to the limelight. This study highlights one such behaviour of carcass burial by Asian elephants in the TGs of north Bengal. We present confirmed anecdotes of carcass burials by elephants in the North Bengal region. We reported four similar case reports to show the carcasses' 'strange' legs-upright-position' and investigated the details of such behaviour. Elephants are social animals, and their cooperative behaviour has been widely published in scholarly articles. However, the 'calf burial' component of thanatology remains briefly studied for African elephants

and untouched for Asian elephants. In this section, we compare our case reports with the existing literature on thanatology in two sub-sections, namely – (1) perimortem and (2) postmortem behaviour.

#### Perimortem behaviour: Calf burial and other comparisons

In a first-ever recorded photographic and postmortem examination evidence of deceased calf burials by Asian elephants, the study contributes to the existing 'faint' knowledge about calf burials by elephants globally. Through direct and indirect evidence, this study highlights elephants' helping and compassionate behaviour during the ceremonial burial of the carcass. A few generalities have to be made about Asian elephants' calf burial behaviour arising from the four case reports presented above.

We state that Asian elephants carry their deceased calves to isolated locations away from humans and carnivores while searching trenches and depressions to bury the carcass. Caring for and carrying the dead offspring has been reported in both altricial (mostly primates: Chimpanzees, baboons, and macaques) (Watts 2019; Carter et al. 2020) and precocial (elephants, giraffe, and peccaries, for instance) offspring (Watson and Matsuzawa 2018; Bercovitch 2020). There are unpublished reports from the West Bengal Forest Department of an elephant cow carrying the carcass for up to two days before leaving it in an isolated location in south Bengal (Figure 6). Its worth noting that only calves are carried and the young adults/adults are not due to non-feasibility. In most cases, these sentient beings do not leave the carcass until putrefaction starts in the deceased calf or is taken over by the forest department officials. Such affinity towards their offspring is attributed to oxytocin and prolonged gestation period (Bercovitch 2020). Such hormonal response aligns with other studies on Chacma baboons (Carter et al. 2020), Olive baboons (*Papio Anubis*), African elephants, and Thornicroft's giraffe (*Girafa camelopardalis*) (Bercovitch 2020). Published scholarships on African elephants have reported calf burials in rare cases (Douglas-Hamilton & Douglas-Hamilton, 1975), but such literature remains absent from Asian context (Sharma et al. 2019).

Our findings also suggest that the modified land-use types, such as tea gardens, offer inclusivity and provide extended forest cover for elephant movement. There are no trenches inside the PAs, and it's exceptionally challenging to locate burial activities/sites inside the closed canopy of semi-evergreen and moist deciduous forests of north Bengal - quite similar to why thanatological studies have briefly touched upon the less populated African forest elephants (*Loxodonta africana cyclotis*) (Hawley et al. 2016). Through extensive patrolling by the forest guards such deceased calves are often detached from the herd to ensure normal elephant migration and the subsequent crowd management which would have occurred on seeing such 'novel' behaviour. With ample trenches and no forest officials, the tea gardens, in these cases, emerge to be a perfect land-use type for burying the carcass. In addition to such ceremonial burials by elephants, the TGs of north Bengal also witness elephant births – thus, providing a common ground for life and death.

The most interesting finding of our study was the positioning of the carcasses in a 'legs-upright-position' in the limited space in the tea gardens. The locals and many conservation gatekeepers often perceive these ceremonial burials as 'accidental'. The 'strange' positioning of the carcass could be explained for better grip for the herd member(s) to hold and lay the calf in the trench. This strategic behaviour also reflects the care and affection of the herd member(s) towards the deceased conspecific. This behaviour suggests that in a situation of space crunch, the herd member(s) prioritize the head for the ceremonial burial before the feet. Elephants are caring social animals, and based on external examination of the carcasses, we also suggest that the calves were placed delicately by gripping one or more legs by the herd member(s). However, we observed petechial haemorrhagic lesions and contusions on the dorsal side of the carcass in all the cases. The contusions in the dorsal part suggest that the carcasses were carried from a distance to locate and bury them at a preferred location (see Figure 6).

This abnormal recumbency is due to a combination of three factors. First, preexisting 'tight' trenches in tea gardens to easily bury carcasses. Second, elephants have become bolder and use human spaces to fulfil their behavioural and dietary needs. People's tolerance towards elephants in north Bengal is more than in other parts of West Bengal and other Indian states (Roy et al. 2022) – presenting a healthy coexistence scenario. Third, the absence of trenches and the presence of carnivores inside the forests projects a problematic

situation for the elephants to choose. Historically elephants must have buried their deceased offspring inside forests subject to trench availability, loose soil, among other environmental factors, but we also suggest that these megaherbivores adapt to the changing socio-ecological scenario and landscapes.

Such sentient behaviour in a high human density region strengthens the morale of coexistence between humans and nonhumans. Thus, their conservation quotient increases through ethics, more than elephants' ecological role, and boosts their socio-ecological rank in society. Such exalted status of elephants is further complemented through religious reverence among various communities worldwide, including India. Births and deaths are memorialized among the local communities and hold a special place in their rural culture, as was done in the case of Devpara TG. Cases 2, 3, and 4 didn't display any such homage due to the isolated location of the carcass and religious heterogeneity in the neighbourhood.

Based on anecdotal evidence from TG managers and workers, the herd made loud vocalizations and left quickly – approximately 30-40 minutes. This behaviour suggests that elephants distinguish human and non-human spaces and avoids dissension with humans.

Vocalization remains an expected behaviour among Asian and African elephants, which was limited to the burial phase. In these cases, loud trumpets signified mourning and preparing for inter-specific aggression (Sharma et al. 2019). A second-hand account (formal interview with the forest range officer) showed a similar case inside Jaldapara national park (an adjoining forest in the same landscape). The elephant herd stayed there for more than four hours near the burial site, most probably because it was undisturbed by humans. His other observation adds that the same herd visited the burial site multiple times to investigate various stages of decay. This observation aligns parallel to the behaviour among African elephants (Douglas-hamilton et al., 2006; Goldenberg & Wittemyer, 2019).

Besides these behaviours, we also observed the efforts of various herd members through their footprints in levelling the soil above the carcass – supporting the social-bonds hypothesis. Moreover, from the size of the footsteps and dung boli, we also infer that carcass burying was a combined effort from allomothers and herd members of different age groups. Such indirect signs have been recorded in India (Sharma et al. 2019) and Africa (Goldenberg and Wittemyer 2019), even though those observations were only limited to mourning and gathering. Also, the herds operated in small numbers, parallel to previous studies on Asian elephants (Pokharel and Sharma 2022) but contrary to African elephants (Silva et al. 2017). Thus, due to the absence of a hierarchical structure among Asian elephants, we report commensurated efforts in the burial of the deceased conspecifics by the surviving herd members, unlike African elephants, where the agency works in hierarchical order (Sharma et al. 2019).

#### Postmortem behaviour:

Following the wildlife protocol, the forest department removed the mounted carcasses and kept the records for research and training. Thus, a further comparison concerning 'visiting the carcass' cannot be made between Asian and African elephants. In natural setting, elephants have been reported to visit the burial site at various stages of decomposition both in Africa (Hawley et al. 2016; Goldenberg and Wittemyer 2019; Rutherford and Murray 2020) and Asia (Pokharel and Sharma 2022). This case study shows the opposite behaviour altogether. In all the examples, the herd fled the site within forty minutes of burial. A formal interview with the tea garden manager shows that the elephants now use a parallel pathway and completely avoid their previous 'active' route. This observation was complemented by indirect evidence of dung boli and footsteps that the elephant herds use the parallel pathways more often than before. This behaviour comes up as a new contrasting behaviour to their African cousins who spend a lot of time investigating and exploring the elephant remains (Douglas-hamilton et al., 2006). Concludingly, burial location plays a central role in determining the postmortem behaviour among elephants, whether inside or outside the PAs.

All observations were opportunistic and must not be generalized for the entire study area or other regions of similar biogeographic and environmental conditions. We report only the cases outside PAs and the behaviour thereafter. The behaviour of the elephant herd inside PAs could be similar to their African cousins, or not. In all cases, all elephant herds avoid burial sites and take parallel routes. For the surviving elephants, these



sites are seen as 'bad milestones' or 'bad omens'.

Any of the deceased calves didn't age more than twelve months and similar to studies on captive elephants, wild Asian elephants also remain susceptible to death in early years (Mar et al. 2012). All the death cases happened due to prevailing illness or natural unfavourable circumstances. Still, we restrained from putting forward the exact reason that claimed the deaths of these calves. However, we claim it concretely that irrespective of the cause of death, the elephant herd attempts to bury the carcass in an abnormal recumbency position inside TGs. Even though the nutritional status of all the calf carcasses was poor and poor-to-normal, we also step back in categorizing the deaths into natural or accidental, except in case 2, where the elephant calf died of multiple organ failure due to acute microbial infection. Cases 1, 3, and 4 suggest deaths due to cardio-respiratory failure, which could have arisen for numerous reasons, including falling into the trench, being stampeded, or suffocating to death naturally. Thus, we refrain from stating that all the deaths happened outside TGs. At the same time, we also report that all the trenches where the carcasses were mounted were too shallow (approximately 0.60 to 0.70 m) and least probable for calves to slip and die. We also eliminate any possibility of infanticide in any of the cases as reported in other cognitive species, such as *Chacma* baboons (Carter et al. 2020) and Mountain gorillas (*Gorilla beringei beringei*) (Watts 2019). This remains an open platform for future research among academics researching elephant behaviour and thanatology. Subsequently, we repress from commenting on whether these death cases would trigger regional HEC.

Even though the two distinct cousins separated c. 9-4.2 Mya (Palkopoulou et al. 2018), the ancestral traits still connect the two species. We hope scholars studying thanatology come up with detailed anecdotes across various species and perform nuanced comparative thanatological studies to connect the phylogenetic continuity. We encourage science and social science evidence-based thanatological studies for not just sentient beings but also non-sentient beings and less-loved species in a changing natural and socio-political environment.

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Table 1: Details of postmortem reports of the four deceased elephant calves

	<i>Case 1</i>	<i>Case 2</i>	<i>Case 3</i>	<i>Case 4</i>
Forest division	Jalpaiguri division	Jalpaiguri division	Buxa tiger reserve (West)	Buxa tiger reserve (West)
Date of death	12.09.2022	17.11.2022	19.08.2022	27.10.2022
Time of death	2 am	2 pm	3 am	6 am
Location	Debpara tea garden	Chunabhati tea garden	Bharnabari tea garden	Majherdabri tea garden
Age of the calf	12 months	4-5 months	10 months	6-8 months
Weight	350 kg	200 kg	300 kg	250 kg
Sex	Female	Female	Male	Male
Trachea	NAD	Hemorrhagic froth present	Hemorrhagic froth present	Hemorrhagic froth present
Lungs	Congested and hemorrhagic	Congested and hemorrhagic	Congested and hemorrhagic	Congested and hemorrhagic
Heart	Epicardium – congested and hemorrhagic	Epicardium – congested and hemorrhagic	Epicardium – congested and hemorrhagic	Epicardium – congested and hemorrhagic
Diaphragm	NAD	Congested	NAD	Ruptured
Nutritional status	Poor	Poor	Poor to normal	Poor to normal
Reason for death	Cardio-respiratory failure due to acute catarrhal enteritis	Multiple organ failure due to acute microbial infection	Cardio-respiratory failure	Respiratory failure
Body carcass	intact	intact	intact	intact
Entry/exit wounds	no	no	no	no

NAD: No Abnormality Detected

### Figure legends

Figure 1: Map of study area showing all case sites along with major land-use types

Figure 2: The image corresponds to case 1 of Devpara TG

Figure 3: The image corresponds to case 2 of Chunabhati TG

Figure 4: The image corresponds to case 3 of Bharnabari TG

Figure 5: The image corresponds to case 4 of Majherdabri TG

Figure 6: A picture showing an elephant carcass being carried by herd members

### Data Accessibility Statement

Data can be accessed through Paswan and Roy, 2023

### Competing Interests Statement

There is no competing interests between the authors

### Acknowledgements

We thank Indian Institute of Science Education and Research, Pune and the Principal Chief Conservator of Forests/Chief Wildlife Warden of West Bengal for granting permission (Memo no: 3067/WL/4R-26/2022) to conduct this study. We are grateful to the tea garden managements and the night guards of Devpara, Chunabhati, Bharnabari, and Majherdabri for the timely intimation and cooperation regarding the calf death incidents. We are equally obliged to the divisional forest officers of Jalpaiguri division and Gorumara wildlife division, forest range officers of Binnaguri, Hamiltonganj, and Majherdabri ranges, and the support staff who have contributed efficiently to the production of this behavioural study. We thank the veterinary officers of Gorumara wildlife division and Buxa tiger reserve for their detailed investigation concerning the calf deaths. We also thank Suraj Kumar Dash of Wildlife Institute of India for his support in preparing the map.











