

On the Incident of Infanticide in Wild Elephants

Sawai Wanghongsa, Kalyanee Boonkird, Suttichati Rabiab and Somsuan Ruksat

ABSTRACT

Wanghongsa, S.; K. Boonkird; S. Rabiab and S. Ruksat. 2006. On the incident of infanticide in wild elephants. *Wildlife Yearbook* 7, 111-119.

An infanticide refers to the killing of conspecific offspring. This behavior has been reported in varieties of animals ranging in size from tiny insects to bears but never in elephants. Here, we report the incident of male infanticide in wild elephants. On 19 February 2005, a baby-elephant, aged 6-9 months, 120 cm shoulder height and 52 cm forefoot circumference, was found dead in the periphery of Dong Yai Wildlife Sanctuary, Buriram province. Close examination by forestry personnel, police and a veterinarian concluded that it was fatally stabbed by a big bull, aged 25 year-old judging from the size of footprints. Two days prior to the discovery of the carcass, a bull in musth with a single tusk was seen rampaging around the forest ranger office. His aggressive behavior towards humans and the proximity of the incident led to the conclusion that the bull was on the scene. This seems to be the first report, known to scientists, of infanticide in wild elephants. We ascribed male infanticide to generalized aggression hypothesis.

INTRODUCTION

An infanticide refers to killing of an offspring of the same species. The behavior occurs in varieties of animals such as langur (Borries, 1997), rabbits (Knkele, 1992), house sparrow (Veiga, 2003; 2004), rats (Brown, 1986; McCarthy and vom Saal, 1986), barn swallow (Miller, 2004), starling (Romagnano *et al*, 1986), egret (Fujioka, 1986), bears (Derocher and Wiig, 1999), bottle-necked dolphin (Patterson *et al*, 1998), baboons (Weingrill, 2000), guira cuckoo (Macedo *et al*, 1999), woodpeckers (Stacey and Edwards, 1983), spiders (Scheider and Lubin, 1997) etc. These animals exhibit infanticide for a number of reasons.

Hrdy (1979) proposed 5 hypotheses of infanticide i.e (1) killing for food (the predation hypothesis), (2) killing for limited resources (the resource competition hypothesis), (3) killing for accelerated oestrous cycle (the sexual selection hypothesis), (4) killing for the survival of the fittest (the progeny manipulation hypothesis) and (5) killing due to stress (the social pathology hypothesis). In addition, Ebensperger (1998) added another hypothesis of infanticide. That is a female killing adopted young (the adoption avoidance hypothesis).

Though it is a very important phenomenon, infanticide is usually overlooked by researchers. This is probably because the behavior occurs very rapidly. Only intensive and long-termed observations may be encounter. Therefore, most of reported cases of infanticide were incidental. In the wild, not a single report was intentionally investigated into the incidence of infanticide. It can be determined by actual sightings such as in the case of egret (Fujioka, 1986), or carcass examination as in bottle-necked dolphin (Patterson *et al*, 1998)

In wild elephants, no reports of infanticide in the long-term and close monitoring studies done by McKay (1973), Buss (1990) and Sukumar (1992). Literature reviews from the Pachyderm, the journal of African elephants and rhino, volume 1 (1983) to volume 38 (2005), indicated no reports of infanticide in wild African elephants as well. Additionally, elephant research papers cited by Wanghongsa (2003a, 2003b) did not mention infanticide. Finally, no reports of elephants among animals that committed infanticide were compiled by Wolff and MacDonald (2004)

We report here the incident of infanticide in wild elephants in Dong Yai Wildlife Sanctuary (DYWS). This seems to be the first report of infanticide in wild elephants, known to science.

The incident

“..... on 19 February 2005, forestry personnel from Dong Yai Wildlife Sanctuary found , during a regular patrol, the remains of a baby elephant in a Eucalyptus plantation on the peripheral boundary of the sanctuary. Close examination by forestry staff, police and a veterinarian indicated the baby elephant was one year old female with 52 cm. forefoot circumference and 120 shoulder height. The animal was seriously punctures on the belly from right to left with its intestine exposed (Figure 1). A 2- inch cut was also found on the back. During the inspection, it was found that a baby was pushed some 20 meters. DYWS's staff disclosed that 2 days prior to finding the remains, a bull in musth with a single tusk was seen rampaging and expressing aggressive behavior towards humans. Examiners finally concluded that the baby elephant was fatally stabbed by a big bull in musth....”



Fig1. Showing serious stab wounds on the flank and 2 deep - cuts on back and hip (arrow)

That is the official report of the unusual death of this elephants done by the DYWS Superintendent, and sent to the Director of Wildlife Conservation Bureau in Bangkok.

Further examination in and around the scene detected footprints of a bull measuring 140 cm circumference (forefoot). Consequently, we estimated the age from the relationships of forefoot and age of Thai elephants reported by Tan-omtung *et al* (1999). The baby elephant was 6-9 months, and the bull was estimated to be 25 year old.

A group of 3 elephants was usually seen by DYWS's staffs roaming in the area before the incident. It consists of mother, young-of-the-year, and sub-adult female. Such a group composition is what McKay (1973) called "Nursing unit" that could not follow the herd because of obviously size differences. Baby elephants could not walk as fast as adults in the herd. This leads to nursing unit becoming gradually separated from the herd. In such situations, calves may be hunted by predators such as lions or tigers. Strong bond formations among female herds are well documented in elephants. The members would help each other in their normal lives. Protection of the baby is a well-known behavior patterns that herds exhibit when in danger or in the process of delivery. However, a nursing unit usually consisted of a few individuals. Protection in this unit is not as strong as the normal herds. Killing of baby can easily happen.

The incident of elephants conspecifically killing elephants was reported in India (Prusty and Singh, 1995), Uganda (Buss, 1990) and Burma (Thom, 1983). All of the reports were fighting between males. It terminated after the death of the rival especially during musth. Elephants

are mega-herbivores, having no natural predators except when young that may be hunted by tigers or lions (Gale, 1971; Buss, 1990; Ruggiero, 1991; Songkakul and Lakkanaworagul, 1992). The death rate decreases as age progresses. Populations are naturally controlled by conspecific killing among mature males, and prolong calf interval in female. Elephants are the only animals that exhibit musth, during which time they are unconscious. Conspecific killing among males and infanticide are probably another mechanism that control elephant population.

Possible causes of infanticide in wild elephant

Elephants are social animals with a long life. Old females, called matriarch, is the leader of a herd. She is the key animal the members depends upon (Macomb, 2001). They exhibit cooperative alliance. Experience has been transferred from generation to generation. New-born babies are cared for and guarded by female members of the herd (Buss and Smith, 1966). Normally, getting close to a baby elephant is very difficult as the mother and other in the herd tend to protect the young. The exception is that if the mother is not a matriarch, the herd will leave it behind. This is a critical time for the mother and offspring, that may be hunted or killed.

Several elephantologists estimated the death rate of one-year-old-African- elephants at the figure of 6-36% (Buss, 1990; Poche, 1980; Fowler and Smith, 1973) and Asian elephants at 15% (Sukumar and Santiapillai, 1993). Natural deaths included drowning, predation, trampling and unknown causes. Infanticide may be mainly contributed to unknown causes.

Of the 6 hypotheses of infanticide mentioned above, four could not totally explain the incidence of infanticide in elephants in this report. They are the predation hypothesis, the resource competition hypothesis, the progeny manipulation hypothesis, and the adoption avoidance hypothesis. The social pathology hypothesis and the sexual selection hypothesis are not likely to be the reason of killing the offspring as well. The social pathology hypothesis may occur in areas very dense in elephants or in areas seriously disturbed. Stress from over-crowded populations and anthropologic disturbance will force some populations to commit infanticide. DYWS covers approximately 313 km². The sanctuary shares its border with Thap Lan National Park (TLNP, 2236 km²) in the north and west, and with Tapraya National Park (TNP, 594 km²) in the west and south. Some 25-30 elephants were estimated to be living in DYWS, 50 in TLNP and 6 in TNP. Crude density was approximately 0.0026-0.027 elephant.km⁻². The density was much lower than the logical density of elephants in an ideally optimal habitat of 0.19 elephant.km⁻² (McKay, 1973). We deleted the social pathology hypothesis from the cause of infanticide in this report because the

sanctuary has not yet been overcrowded, and the male was in musth at the time of committing infanticide.

Killing the offspring to accelerate the oestrous cycle of the mother (the sexual selection hypothesis) is probably not the case of elephants in DYWS. Usually mothers whose offspring is killed may require time to resume oestrus. Killing the offspring may not benefit the musth male, because the female is not ready to copulate at the time of killing. Duration from baby-killing to when the elephant is in heat may be too long and males may recover from musth. Instead, alpha dominant males may take the benefit from infanticided mother when in heat, as only an alpha male could mate with a female in oestrous (de Villiers and Kok, 1997). We also delete sexual selection Hypothesis as a cause of infanticide in DYWS.

Male elephants normally come into musth when mature (Eisenberg and Lockhart, 1972). Musth is correlated with dominant stature (Eisenberg and Lockhart, 1972; Eltringham, 1994). Musth period in elephants is similar to the period when other animals are in heat (Kadamdi, 1949). During which time male hormones called testosterone increases 40-60 times from the normal (Kurt, 1984). During the musth period, fluids are emanated from temporal glands located between the ears and eyes of both sides. The fluids are a pheromone called Frontalin (Rasmussen, 2003). Frontalin will attract oestrous female and repel non-oestrous females and other males. Thus, musth males have a chance to copulate with females in heat (Turkalo, 1996). The temporal gland varies in size according to body condition of elephants in musth. In some animals, the gland increases to the size of a basketball (Rasmussen, 2003). Such an enlarged gland will press against the nervous system, causing pain like toothache in humans. Elephants will eventually exhibit aggressive behavior. The larger the gland, the more painful and the more aggressive the animal. An elephant in musth killed 2 bulls and was reported in Orissa by Prusty and Singh (1995) probably because of serious pain.

On the other hand, Gale (1971), who had long experience with timber elephants in Burma, strongly believed that musth had no any relation to copulation. It happens in both male and female elephants. He further elaborated musth to the stimulation of fighting, destroying and killing anything musth elephants come across. This is a natural mechanism to control populations of predator-free animals like elephants. Death rate of adult elephants was estimated at 2-3% (Fowler and Smith, 1973; Sukumar, 1992). This is probably the case of infanticide in DYWS.

We, therefore, concluded that the male infanticide in DYWS are normal behavior of aggressive musth elephants (the generalized aggression hypothesis) caused by enlarged temporal glands.

Recommendations

Due to the high mortality rate of elephant calves, close and intensive examination of a young elephant carcass found in the jungle should be deliberately done. Causes of death may be infanticide, which is not uncommon in the animal world especially in an insular habitat that approaches carrying capacity. Clues that might lead to infanticide are as follows:

1. In case of infanticide committed by elephants with tusks, the appearance of stab wounds may be observed on fresh a carcass as in this report. Broken ribs might also be found in the remains.
2. In case of infanticide done by tuskless elephants:
 - 2.1 The carcass; the tuskless can kill calves only by means of trampling. Footmarks might occur on the calf's body. To determine whether trampling caused by infanticidal male or by nervous members of the herd is to investigate the size of footmarks on the body. Different size footmarks might occur on calves trampled by nervous elephants. Calves trampled by an infanticidal male, only one size of footmarks may be found. A number of footprints on the surrounding ground and vegetation damage might also be an important clues. Elephant herds that panic are usually much more destructive to the vegetation, in particular the undergrowth, because of a large numbers in the herds. Nursing units that panic cause less damage to the vegetation.
 - 2.2 The Remains; It is very difficult to determine whether calves trampled by an infanticidal male or panicked members in the herd. However, a number of broken bones may be detected which is quit different from broken bones caused by tusks that scrap may be apparent.

It is worth examining the death of baby elephants in the wild. Different strategies have been mentioned for elephants to regulate their populations, Examples are prolong adolescent stage, extend calving intervals, and conspecific killing. Derocher and Wiig (1999) pointed out that infanticide is very common in population close carrying capacity. A **k**selected species is likely to be common animals that commit infanticide. Elephants are not an exception.

We would like to thank personnel from Livestock Department and Policeman who help investigate the carcass and to forestry personnel for their invaluable information regarding behaviour of the herds and the mush. To a friend who kindly go through a manuscript at first hand.

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