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First Evidence of Allonursing in Gaur (*Bos gaurus gaurus*): Social Flexibility in a Translocated Population

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Abstract

Allonursing is the nursing of non-filial offspring by lactating females. It is a rare form of alloparental care and remains virtually undocumented in wild bovids. Here, we report the first photographic and video evidence of allonursing in gaur (*Bos gaurus gaurus*), Asia's largest extant bovine, from Bandhavgarh Tiger Reserve, Madhya Pradesh, India. The behaviour was observed during soft release monitoring as part of an ongoing project on population management strategies for gaur through supplementation. A lactating female was observed nursing a non-filial male calf from a different natal herd within the soft release enclosure. This behaviour provides new insights into the social flexibility of gaur and has implications for understanding behavioural flexibility in conservation-driven translocation efforts.

Keywords: Allonursing, alloparental care, bovine, gaur, mega herbivore, supplementation.

Introduction

Maternal care in ungulates is generally uniparental and short-term, especially for wild species of Bovidae (Stead *et al.,* 2019). Allonursing is a rare form of alloparental care in which a lactating female nurses a non-filial offspring. Alloparental care has been observed and documented across numerous taxa, including birds, rodents, primates, canids, carnivores, and megaherbivores (Mota-Rojas *et al.,* 2021; Stead *et al.,* 2019; Bădescu *et al.,* 2016; Malyjurková *et al.,* 2014; Lewis *et al.,* 1997). While alloparental care is common in cooperative breeders, it is unprecedented among wild Bovidae, where maternal care is extremely uniparental (Orihuela *et al.,* 2021). Though allosuckling has been described in water buffaloes, there has been no documentation of allonursing in wild bovids, particularly gaur, until now (Orihuela *et al.,* 2024).

Gaur (*Bos gaurus*), the largest extant wild bovid, is a gregarious herbivore found across South and Southeast Asia (Duckworth *et al.,* 2008). In India, the distribution of species spans over three regions: Northeast, South-western, and Central Indian landscapes (Ashokkumar *et al.,* 2011). The species inhabits diverse habitats ranging from evergreen to thorn forests and from lowlands to elevations of up to 2800m above mean sea level (Sankar *et al.,* 2013; Ashokkumar *et al.,* 2010; Krishnan, 1972). Gaur lives in a matrilineal society with fluid group composition where male lives solitary or form bachelor groups and mixed herds (Qureshi *et al.,* 2025; Duckworth *et al.,* 2016; Ashokkumar *et al.,* 2011).

After becoming locally extinct in Bandhavgarh Tiger Reserve, Madhya Pradesh, in 1998, 50 individuals of gaur were reintroduced to the landscape in 2011-12 (Sankar *et al.,* 2013, Nigam *et al.,* 2022). The reintroduction was carried out to restore a viable gaur population and ecosystem functions. Also, gaur is a valuable prey species for large carnivores such as tigers (Sankar *et al.,* 2013). Over time, the translocated population showed a growth rate of 5.7% every three years (Nigam *et al.,* 2022). However, a genetic bottleneck became evident, necessitating the supplementation of individuals from a new genetic pool to improve genetic variability and ensure long-term species survivability (Nigam *et al.,* 2022). Consequently, 23 animals from different herds were translocated from Satpura Tiger Reserve, Madhya Pradesh, in February 2025. The animals were soft-released into an enclosure with ample space and time for acclimatization and social bonding. During monitoring, a unique case of allonursing was observed.

Native herd profile

A total of five herds were chosen for the capture and translocation of gaur from Satpura Tiger Reserve to Bandhavgarh Tiger Reserve, which included 18 females and 5 males (Table 1). Care was taken while selecting the individuals for capture, and efforts were made to avoid disrupting social bonds or introducing biases that could compromise the group integrity. An adult female gaur (ID: BF-7) and male calf (ID: BM-4), which were noticed staying together during the capture operation and identified as biological mother-calf, were captured together and translocated. After soft releasing the animal in the enclosure at Bandhavgarh Tiger Reserve, BF-7 was confirmed as a non-biological mother over a series of observations.

Table 1: Details of translocated gaur from Satpura Tiger Reserve to Bandhavgarh Tiger Reserve (Nigam *et al.,* 2025).

Sr. No.	Capture Date	Area/ Herd ID	Animal ID	Sex	Estimated Age (in years)	Age Class	Colour Coded Bands /VHF* Collar	Soft Release in Enclosure
1	20-02-2025 (Morning Hours)	Sridana/ Herd 1	BF-1	Female	5-6	Adult	VHF	21-02-2025
2			BF-2	Female	6	Adult	Red Band (with D47 LORA device)	
3			BF-3	Female	8-9	Adult	Brown-Blue Band (VHF)	
4			BM-1	Male	5-6	Adult	Orange Band	
5			BM-2	Male	2.5-3	Sub-Adult	VHF	
6	20-02-2025 (Evening Hours)	Sridana/ Herd 2	BF-4	Female	4-5	Adult	Yellow Band	21-02-2025
7			BF-5	Female	3-4	Adult	Sky Blue-Yellow Band (VHF)	
8			BF-6	Female	4-5	Adult	Green Band	
9	21-02-2025	Churna/ Herd 3	BF-7	Female	3-4	Adult	Red-Green Band	22-02-2025
10			BM-3	Male	2.5-3	Sub-Adult	Brown-White Band (with LORA device)	
11			BM-4	Male	1.5-2.5	Calf	NOT ANY	
12			BF-8	Female	1.5-2	Sub-Adult	NOT-ANY	
13	22-02-2025 (Morning Hours)	Marram/ Herd 4	BF-9	Female	3-4	Adult	White Band	23-02-2025
14			BF-10	Female	4-5	Adult	Brown Band (with LORA device)	
15			BF-11	Female	4-5	Adult	Pink Band	
16			BF-12	Female	5-6	Adult	VHF	
17			BF-13	Female	4-5	Adult	Red-Blue Band	
18			BF-14	Female	4-5	Adult	VHF	
19	22-02-2025 (Evening Hours)	Churna/ Herd 5	BF-15	Female	2.5-3	Sub-Adult	Yellow-Red Band	23-02-2025
20			BF-16	Female	3-4	Adult	VHF	
21			BF-17	Female	2.5-3	Sub-Adult	White-Blue Band	
22	23-02-2025	Churna/ Herd 5	BM-5	Male	5-6	Adult	VHF	24-02-2025
23			BF-18	Female	4-5	Adult	Blue-Green Band	

VHF* - Very High Frequency

Observation of Allonursing

On 8th March 2025, we observed a newly translocated male calf (ID: BM–4) at Bandhavgarh Tiger Reserve inside the soft-release enclosure, approaching and attempting to suckle from an adult female gaur (ID: BF–6). Both individuals were brought in from different wild herds, with BM–4 being brought on 21 February and BF–6 on 20 February 2025. There was no evidence of kinship between BM–4 and BF–6. Moreover, BF–6 neither avoided BM–4 nor displayed aggressive behavior. Instead, the female gaur (ID: BF-6) stood relaxed and allowed the calf (ID: BM-4) to suckle and groomed the calf (Figure 1).

Allonuring behavior was observed opportunistically for the next 23 days, until 30th March 2025, before the animal's release into the wild. As the animals were not purposefully followed, no systematic study design was employed. During this period, BM–4 continually sought to suckle from BF–6, and BF–6 allowed the calf to suckle. The seemingly effortless and tolerating behavior by the female, along with grooming while suckling,

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suggested that an affiliative relationship formed between the female gaur and calf (Figure 1). Throughout the observation, neither individual appeared to show signs of rejection, defensive behaviors, or manifest distress.

The animals were identifiable with the full combination of ear tags, neck bands, and horn sleeve markers (Figure 2&3). As all translocated individuals came from various native herds, and the female BF–6 and the male calf BM–4 did not share any established biological relationship, this case was unequivocally confirmed as allonursing in gaur, a rarely observed phenomenon in social animals and a specific form of alloparental care (Mota-Rojas *et al.,* 2021; Engelhardt *et al.,* 2014).

Figure 1: A lactating female gaur nurses a non-filial calf

Figure 2: Camera trap picture of the female gaur with the non-filial calf

Figure 3: Calf with the non-biological female gaur after being released from the enclosure into the open forest

Discussion

The case of BM–4 and BF–6 is the first documented case of allonursing in free-ranging gaur. It highlights the social flexibility to develop some form of social bond between the species in a novel ecological and social context introduced through conservation translocation. The frequent presence of and prodromal opportunities of affiliation suggest some form of intent (Engelhardt *et al.,* 2014; Mota-Rojas *et al.,* 2021), unlike those cases of milk theft or mismothering.

Alloparental care has been observed and documented across numerous taxa (Guo *et al.*, 2022; Mota-Rojas *et al.,* 2021; Stead *et al.,* 2019; Bădescu *et al.,* 2016; Malyjurková *et al.,* 2014; Lewis *et al.,* 1997). Earlier studies have recorded alloparental care in some domestic and semi-wild species such as water buffalo (Orihuela *et al.,* 2024) and reindeer (Engelhardt *et al.,* 2014). In wild bovid species, the allonursing is virtually unrecorded. Several hypotheses have been proposed to explain why alloparental care occurs, some of which include misdirected maternal behavior, milk evacuation process, gaining maternity skills, kin selection, and reciprocal altruism (Engelhardt *et al.,* 2016; Maniscalco *et al.,* 2007). For calves, such behavior may be beneficial by providing immunological advantages and nutritional compensation (Orihuela *et al.,* 2024; Mota-Rojas *et al.,* 2021; Engelhardt *et al.,* 2014; Brandlová *et al.,* 2013).

As shown in domestic water buffalo (*Bubalus bubalis*), cooperative nursing has been observed in a high-density resource-limited context (Orihuela *et al.,* 2024). We hypothesize that the socially dynamic and controlled space of the soft-release enclosure was the essential ecological cue that facilitated allonursing in this case. These semi-natural environments could promote other affiliative responses as species-specific adaptive responses to environmental stressors and social situations associated with their translocation.

In our study, the occurrence of allonursing in translocated gaur may be linked to: a) Mistaken direct maternal behavior, because of hormonal state (Maniscalco *et al.,* 2007; Engelhardt *et al.,* 2014), b) Formation and renegotiation of social bonds in a new social environment (Mota-Rojas *et al.,* 2021; Orihuela *et al.,* 2021), c) Potentially reciprocal altruism or other mechanisms of inclusive fitness, especially in systems where kin discrimination is weak (Hamilton, 1964; Engelhardt *et al.,* 2016), or d) Social cohesion by virtue of stress, facilitated by proximity in an enclosure (Malyjurková *et al.,* 2014).

Most importantly, the soft release of the male calf in the enclosure probably added to its survival. Maternal dependency of the calf could have made it vulnerable due to starvation and predation, especially by tigers. Therefore, demonstrating allonursing in this context is not only an indication of behavioral plasticity, but also a situational altruistic response. This incident also underlines the ecological significance of transitional enclosures. Such enclosures could promote species-appropriate social behaviors that induce fitness in new environmental conditions associated with conservation.

In the context of this finding, translocation-related stress, social restructuring, and affiliative bonding may have contributed to the emergence of allonursing behavior. The defined area of enclosure may have facilitated social restructuring that supported alloparental care. Remarkably, such behavior could specify adaptive social flexibility in gaur, particularly in response to novel environmental or social conditions.

Conservation implications

Understanding the alloparental behaviour in translocated animals has a significant role in refining conservation strategies. In species with complex social systems, behavioural plasticity, such as allonursing, could enhance calf survival in unfamiliar environments, especially when natal social bonds are disrupted. Further, given current observations on gaur and other similar findings on buffaloes, contexts that facilitate a series of affiliative interactions may help alleviate the stress of social instability. The documentation of allonursing in gaur highlights the significance of post-release monitoring to understand the complexity of behavioral traits. This report can help better inform translocation efforts and facilitate social integration of translocated individuals in a novel environment.

Acknowledgment

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ETHICAL STATEMENT

The work does not involve any animal handling or invasive sampling. Observations are carried out from the predesignated watchtowers and camera traps to minimize disturbance to wildlife.

CONFLICT OF INTEREST

Bilal Habib & Parag Nigam hold editorial positions at the Journal of Wildlife Science. However, they did not participate in the peer review process of this article except as authors. The authors declare no other conflict of interest.

DATA AVAILABILITY

The videography will be provided upon request from the corresponding author

AUTHOR CONTRIBUTIONS

GAK contributed in data collection; GAK, BB prepared the first draft; RV edited and refined the manuscript; PN, BH provided inputs on the draft.

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