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Cannibalism in Eurasian otters (*Lutra lutra*)

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Abstract

The Eurasian otter, *Lutra lutra*, faced adversity in Europe in the 1950s and 1960s due to hunting, declining fish populations and the American mink invasion. Slow recovery since the 1970s led to a 'Near Threatened' in the IUCN Red List status, but recent pollution, fishing pressure and habitat loss caused slight population declines. Otters, known for aquatic habits, are mainly piscivorous and exhibit solitary or social behaviours. Infanticide with parent-offspring cannibalism has been previously reported in otter species, but although cannibalism has been suggested, it has not been documented before. This study presents the first documented case of cannibalism among free-living Eurasian otters observed in northern Norway. Some authors described cannibalism as an opportunistic resource-efficient behaviour in several mammal species, offering benefits like weight gain and reduced competition, challenging the view of adverse health effects. Factors leading to otter cannibalism include ecological changes, resource competition with other species and global warming and overfishing practices contributing to increased otter competition. Further studies will be vital to answering intriguing questions about the implications of cannibalism for otter conservation.

KEYWORDS

Arctic, behaviour, cannibalism, *Lutra lutra*, otter

1 | INTRODUCTION

The '50s and '60s were a difficult time for the Eurasian otter in Europe, *Lutra lutra*, due to hunting, the decline of trout and salmon and the spread of American mink, *Neovison vison*, as an invasive alien species (Bevanger & Henriksen, 1995; Christensen & Heggberget, 1995). Since the '70s, European populations have slowly recovered, and now the species is listed on the worldwide IUCN Red List as 'Near Threatened' (Loy et al., 2022). However, in recent years, populations have decreased due to pollution in water, fishing pressure, habitat loss, fragmented population and illegal hunting (Duplaix & Savage, 2018). Particularly in Norway, otters were near extinction in the

'80s before the government made hunting illegal; now, after this prohibition, the species has recovered, and it is distributed along northern and central Norway and classified as 'Least Concern' in the Norwegian Red List (Artsdatabanken, 2021; Van Dijk et al., 2020).

Otters are generally recognised for their aquatic nature and habitat near rivers and lakes (Simpson & Coxon, 2000). This nocturnal carnivore mammal feeds mainly on fish but can also play a role as an opportunistic forager, preying on aquatic insects, reptiles, amphibians, birds, small mammals and crustaceans. Previous studies have established that, in Europe, the northern population is more piscivorous than the southern ones (Loy et al., 2022). Described mainly as solitaires, otters are territorial and aggressive but also have been

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described as social with active interactions during the breeding season (Kruuk, 2010; Quaglietta et al., 2014; Ribas & Mourão, 2004). If a group is spotted, it is typically familiar, including a mother with her cubs, males usually stay away from the cubs. Only several females can coexist and defend their territory against other females (Kruuk, 2010). Under some circumstances, such as competition for resources, induction of estrus or adverse conditions, infanticide has been described in several mammal species, which involves the killing of offspring within the same species and sometimes the parent-offspring cannibalism (Bose, 2022; Britnell et al., 2021). In this context, infanticide of the cubs has been recorded in some otter species, such as the giant otter (*Ptenonura brasiliensis*) (Mourão & Carvalho, 2001). Also, Britton et al. (2006) reported that the remains of a juvenile Eurasian otter were recovered from an adult male's stomach, confirming the infanticide in this species. Cannibalism, understood as the consumption of conspecifics, has been suggested in Eurasian otters; however, it has never been confirmed by video or photographs (Simpson & Coxon, 2000; Van Allen et al., 2017). This intriguing and often unsettling

phenomenon manifests across all kinds of species, such as fish, leopards and, less frequently, in other mammals like chimpanzees (Bose, 2022; Fedurek et al., 2020; Pereira et al., 2017; Riesch et al., 2022; Steyn & Funston, 2006). In bears, for example, cannibalism is an example of a defined casual and opportunistic behaviour; it increases nutrition and decreases competition for resources but is also frequently associated with sexually selected infanticide (Allen et al., 2022).

To our knowledge, this is the first record of cannibalism in adult Eurasian otters.

2 | OBSERVATION

On the 13th of February 2024, between 15:40 and 16:00 h, close to Pundsletta, the northern area of Norway, the Sørrelva River exhibited extensive freezing, indicating its impending convergence with a fjord 900 m downstream. Jesús Garrido-Moreno (JGM) was along the bank



FIGURE 1 Photographs captured by JGM at Sørrelva River depict an otter (*Lutra lutra*) consuming its conspecific from different shooting locations. A comprehensive view is presented in image A while individual sizes are compared, revealing striking similarities in images B and C. Images C and D further confirm the ongoing feeding process. Since the ice was too thin to cross safely, JGM could not examine the carcass until after the live otter had left. [Color figure can be viewed at [wileyonlinelibrary.com](https://onlinelibrary.wiley.com/doi/10.1002/rta.4323)]

of Sørrelva River (68°14'25" N, 17°24'36" E), making observations of wildlife and sitting 40 m in front of two Eurasian otters. One adult of undetermined sex was seen feeding on the dead body of another adult (Figure 1). JGM made direct opportunistic first sightings and photographic documentation of cannibalism in Eurasian otters with a Sony Alpha A1 Digital Camera equipped with a Sony 400 mm f2.8 GM lens. No other individual of this species or others was seen in the area. As shown in Figure 1b, both otters' bodies were similar in size and were adult individuals. No bites, injuries or other damages were observed in the live otter.

3 | DISCUSSION

This sighting confirms adult-to-adult cannibalism in Eurasian otters. In the case of the Eurasian otter, previous reports described infanticide with parent-offspring cannibalism, and intra-species aggression resulting in the loser's death has been reported among adult giant otters, but adult-to-adult cannibalism has not been recorded before (Britton et al., 2006; Schweizer, 1992; Simpson & Coxon, 2000).

Although some authors described cannibalism as a disease transmission pathway, this behaviour could offer more potential benefits, such as weight gain and reduced competition, than adverse effects on individual health (van Allen et al., 2017). The possible factors that may lead otters to practice cannibalism raise intriguing questions about their ecology and behaviour. Recent research on parent-offspring cannibalism provides insights into potential motivations behind such behaviour. Parents can make filicide (killing and eating their offspring) to promote future reproductive opportunities. In his review, Bose (2022) found that this phenomenon allows a more efficient allocation of resources, redirecting the energy saved from caring for current offspring and the ones gained when eating them. Despite pregnancy and birth requiring a great deal of energy, the highest physiological cost in mammals occurs during lactation and caring for offspring until they are independent (Speakman, 2008). On the other side, in some species like bears, infanticide can be a strategy for reducing sexual or food competition, but also to stop lactating and starts a new estrus (Allen et al., 2022).

As mentioned above, otters inhabit aquatic and semi-aquatic environments. In winter, the freezing of the water surface reduces prey availability. Also, they are compelled to break through the ice to prey, significantly reducing both the frequency of feedings and the variability of their diet (Reid et al., 1988; Reid et al., 1994). Moreover, it is essential to highlight the competition with the American mink, which has occupied the ecological niche previously inhabited by otters and competes for resources (Kjoberg, 2023). In Norway, minks are negatively associated with areas inhabited by otters in western Norway, highlighting interference competition rather than competitive exclusion. However, the long-term ability of otters to suppress mink populations remains uncertain (Guidos, 2019).

Reducing resources in the Arctic area, exacerbated by factors like global warming, overfishing and illegal fishing, could contribute to

increased competition among otters due to the reduction of feeding and the changes in the water environments (Koenigk et al., 2020; Standal & Hersoug, 2023). However, the documented cannibalism behaviour occurred less than a kilometre away from a fjord, an area known for its year-round availability of food resources (Harbour et al., 2021; Pedersen et al., 2016). Additionally, as could occur in Norway, climate change might elevate the temperatures in northern waters, potentially boosting fish populations in these areas (Hunt et al., 2016). Nevertheless, changes in patterns of benthic fauna have been observed in disturbed fjords, and cannibalism can be considered a multifactorial behaviour with social and environmental components (Włodarska-Kowalczyk et al., 2005). While resources-based and social arguments have been proposed, recent studies point to additional factors, such as climatology, pollution or water quality, that may influence cannibalism (Duplaix & Savage, 2018; Koenigk et al., 2020; Mason, 1995).

Despite the record, the location of the photographer made it impossible to determine the sex of both individuals, so we could not conclude if it was a case of a male-male dominance attack. Moreover, we could not confirm if the deceased otter died due to a natural cause, a fight between them or other predators. Nevertheless, the literature suggests that cannibalism could happen when animals are exposed to critical environmental, ecological or social conditions. Therefore, further research is needed to understand the motivation for this behaviour in Eurasian otters and its implications for species conservation.

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CONFLICT OF INTEREST STATEMENT

There is no conflict of interest.

DATA AVAILABILITY STATEMENT

Data sharing not applicable to this article as no datasets were generated or analysed during the current study.

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