

The Cinereous Vulture, *Aegypius monachus*: Cannibalism in its Wintering Ground¹

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월동지에서 독수리(*Aegypius monachus*)의 카니발리즘¹

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ABSTRACT

Cannibalism is a widely observed phenomenon in the animal kingdom. However, it is rarely found among birds outside nests in the wild because it occurs irregularly and it is almost impossible to monitor animal behavior constantly. On 17 January 2017, this behavior was directly observed from a group of vultures feeding on a conspecific in a paddy field near Lake Geumho in Haenam-gun (34°35'58.25" N, 126°26'57.64" E). It was observed and recorded with the binoculars and a camera with a telephoto lens in a car approximately 20 m (or 60 m) away from the site. The observer approached the feeding site after the last vulture had finished feeding and flown away and found remains of a vulture, including body feathers, skull, sterna keel, and both legs. It was the first report of cannibalism in Cinereous vulture *Aegypius monachus* in its overwintering grounds. The remaining skeleton was very fleshy, and the surrounding grass was wet with the blood of vulture. No other traces of a mammal or bird that could have been the vultures' prey were found. This report provides a detailed account of the events related to this rare observation and the causes that might have led to it.

KEY WORDS : INTRASPECIFIC PREDATION, INFANTICIDE, SIBLICIDE, HAENAM

요 약

카니발리즘은 동물계에 널리 알려져 있다. 그러나 조류의 경우 둥지 조사가 아닌 야생에서 관찰되는 경우는 드물다. 이러한 행동은 불규칙적으로 발생할 뿐만 아니라 지속적 관찰이 거의 불가능하기 때문이다. 독수리의 카니발리즘은 2017년 1월 17일 월동지인 해남군 금호호 농경지 주변(34°35'58.25" N, 126°26'57.64" E) 한 무리의 독수리에서 관찰되었다. 관찰은 현장으로부터 20m 또는 60m 정도 떨어진 곳의 승용차 내에서 쌍안경을 통하여 이루어 졌고, 사진 촬영을 위해 망원렌즈가 장착된 카메라도 함께 사용되었다. 현장에서 취식을 하던 마지막 독수리가 떠난 후 먹이의 잔존물을 확인하였다. 독수리가 취식했던 장소에는 독수리의 몸깃, 두개골, 흉골, 양쪽 다리 등 독수리의 잔존물들이 발견되었다. 그리고 그 외에는 그들의 먹이가 되는 다른 동물의 어떠한 흔적도 발견되지 않았다. 본 연구는 독수리의 카니발리즘에 관한 최초 보고로 카니발리즘에 대한 세부적인 설명 및 그 행동에 영향을 미친 환경적 요인에 대하여 알아보고자 하였다.

주요어: 종내포식, 유아살해, 형제살해, 해남

1 접수 2018년 5월 12일, 수정(1차: 2018년 6월 11일), 게재확정 2018년 6월 14일
Received 12 May 2018; Revised (1st: 11 June 2018); Accepted 14 June 2018

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INTRODUCTION

Cannibalism, or intraspecific predation, is widely observed in the animal kingdom (Fox, 1975; Ebensperger, 1998; Ontiveros and Pleguezuelos, 2014). In birds, cannibalism has been found in diurnal raptors (Ingram, 1959; Jones and Manez, 1990; Negro, *et al.*, 1992, Boal and Bacorn, 1994), owls (Ingram, 1959), and colonial water birds (Smith and Munro 2008; Gubiani *et al.*, 2012). Most of these cases have been observed during nest monitoring, and involve parental infanticide (Jones and Manez, 1990; Markham and Watts, 2007; Korňan and Macek, 2011; Solaro and Sarasola, 2012; Ontiveros and Pleguezuelos, 2014) or siblicide (Ingram, 1959; Bortolotti *et al.*, 1991; Boal and Bacorn, 1994). However, cannibalism in the wild is rarely found, except in nests, because it is impossible to constantly monitor animal behavior without knowing when and in which species and individuals cannibalism might occur (Polis, 1981; Lecea *et al.*, 2011, Ontiveros and Pleguezuelos, 2014). *Aegypius monachus*, the Cinereous vulture, is a typical winter migratory bird, which spends winter in Korea and summer in Mongolia (del Hoyo *et al.*, 1994; Kim *et al.*, 2007; NIBR, 2011; Kim *et al.*, 2015; Kim *et al.*, 2016). The species is classified as near threatened (NT) in the International Union for Conservation of Nature (IUCN) Red List, as there are only 2,300–2,500 Cinereous vulture pairs in Europe and 5,500–8,000 pairs in Asia (IUCN, 2017). Approximately 2,500 Cinereous vultures spend winter in Korean regions (e.g., Paju-si, Goseong-gun, Cheorwon-gun), forming groups of 100–500 (occasionally more than 1,000) individuals that rely almost exclusively on the artificial supply of livestock by-products (cow, pig, chicken, etc.) for survival (NIBR, 2011; IUCN, 2017). About 40–60 vultures spend winter in the Geumho wetlands, Haenam, South Korea, and their main sources of food include carcasses of water birds such as ducks or geese. They also feed on livestock by-products scattered around farmlands by directly locating them (NIBR, 2011). Here, this report provides the first case of cannibalism observed in Cinereous vultures with in a paddy field near Lake Geumho, South Korea.

MATERIALS AND METHODS

On 17 January 2017, for about one and a half hour (between 15:00 and 16:30), intraspecific predation was directly observed in Cinereous vulture *Aegypius monachus* in a nearby reed wetland close to a paddy field near Lake Geumho (34°35′58.25″ N, 126°26′57.64″ E) during bird-watching. To examine what the vultures were feeding upon, it was observed and recorded approximately 20 m (or 60 m) away from the site in the car, and after the last vulture finished feeding and flew away, the observer approached the feeding site and identified remains of the prey. The behaviour of vultures were observed using 10 × 30 binoculars (Swarovski CL) and photographed using a camera (Nikon D500) with a telephoto lens (Nikon AF-S Nikkor 400 mm 1:2.8 DII), in order to record their behaviour.

RESULTS AND DISCUSSION

On 17 January 2017, around 15:00, five vultures began to soar in the sky and some soon flew down to the nearby reed wetland close to a paddy field near Lake Geumho (34°35′58.25″ N, 126°26′57.64″ E). When the observer approached within 20 m of the site by car, but, because the vultures had landed in a wetland about 1.5 m lower than the surrounding area, the reeds around the paddy field obscured the view. However, a high-pitched vulture cry could be heard from the reeds, and, using binoculars to look between the reeds from the car, seven vultures were found. Four vultures appeared to be fighting, and three of these were spreading their wings while holding down one vulture and pecking on it; this vulture was crying and spreading both wings, overturned on the ground. The other vultures standing nearby looked in the direction of the observer. Because fighting for food is a common behavior among vultures, this was not a major concern, although fighting when there was no food around (no traces of any animal carcasses, such as birds or mammals on the ground) was odd. In addition, the possibility of vultures killing a conspecific while it was alive was not anticipated, based on their dietary habit of eating dead animal carcasses and very rare reports of vultures preying on live animals such as lizards and insects (del Hoyo *et al.*, 1994; NIBR, 2011).

When the observer was approximately 60 m away from

the site, more vultures (about 20) gathered in the sky; minutes after, some flew down toward the site. The vulture cry reached a higher pitch and was more intense than usual; this higher pitch persisted for about 5 min (with the total duration of the cry being more than 20 min) more before it stopped. After for about 30 min, using binoculars, the observer looked at the vultures between the reeds to determine what happened to the vulture and realized that it remained overturned by other vultures but its wings were no longer moving and the crying had also ceased. Only then did evidence suggest that something unusual might have happened: at least nine vultures had been feeding on their conspecific. When the observer went back again within 20 m of the area where the vulture was being attacked,

seven vultures began to emerge one after another from the reed wetland and sat and rested side-by-side on high ground; their filled crops indicated that they had fed sufficiently, and its remains were found. One was still pecking on the flesh from the skeleton (Fig 1). After the last vulture finished feeding and flew away, one vulture was still present, crouching at the site and unable to fly. The observer approached the feeding site and found remains of a vulture, including body feathers, skull, sterna keel, and both legs. The bones of wings and tail, as well as flight and tail feathers, and both feet were not pecked and eaten (Fig 2). The remaining skeleton was very fleshy, and the surrounding grass was wet with the blood of vulture. No other traces of a mammal or bird (feathers, fur, skeleton,



Figure 1. Cinereous vulture pecking and eating flesh from (A) the head (a, skull and bill) and (B) one of the legs of another Cinereous vulture after it was killed by a group of conspecifics.



Figure 2. Remains of a Cinereous vulture eaten by conspecifics. The photograph shows that body, wing, tail feathers, and skeleton (skull, sterna keel, and both legs) were eaten but feet were left intact.

etc.) that could have been the vultures' prey were found.

Cannibalism (i.e., intraspecific predation) in nests, when food is scarce, significantly affects the breeding success of Eleonora's falcons *Falco eleonora* (Hadjikyriakou and Kirschel, 2016). A partial reduction of brood size by infanticide has occasionally been explained by constraints on food availability (Ingram, 1959; Jones and Manez, 1990; Solaro and Sarasola, 2012), although food shortage alone cannot explain infanticide (Solaro & Sarasola 2012). An extra nestling in a brood represents a reservoir of nutrients, and its consumption allows recovering part of the considerable energy used for reproduction in Bonelli's eagles *Aquila fasciata*; however, cannibalistic parents might be considered as having an aberrant behavior in this species (Korňan and Macek, 2011; Ontiveros and Pleguezuelos, 2014). Other possible causes for infanticide might be the stress associated with breeding near humans or with the sensor camera set up for monitoring a nest (Fox, 1975; Solaro and Sarasola, 2012). However, a vulture directly attacking another live vulture and eating it is considered a very rare behavior for scavengers like Cinereous vultures.

The paddy field and wetland around Lake Geumho are overwintering grounds for migratory birds, and many ducks and geese spend winter here, feeding on the remaining grains and stems of rice after it has been harvested from October to March (Kim *et al.*, 2015; Kim *et al.*, 2016). Because vultures in the wetlands around Lake Geumho directly search for their prey in the wild, increasing or decreasing numbers of ducks and geese have a major impact on the overwintering vulture community (del Hoyo *et al.*, 1994; Kim *et al.*, 2015; Kim *et al.*, 2016). The highest number of ducks and geese are found at the start of winter, between November and December, which is the period when it is most probable to find carcasses that become food for vultures (del Hoyo *et al.*, 1994; Kim *et al.*, 2015; Kim *et al.*, 2016). However, as the number of ducks and geese decreases throughout mid-winter (January), the likelihood of finding food for scavengers like vultures decreases, causing them to go hungry for an extended period. Thus, cannibalism as observed in the present study might be due to such a decrease in available food resources (Lecea *et al.*, 2011; Ontiveros and Pleguezuelos, 2014). In fact, a similar case was reported for the Eurasian griffon vulture, *Gyps fulvus*, in Spain (Lecea *et al.*, 2011), when an individual was trapped, killed, and eaten by its conspecifics. In this case, however, it was not

clear that the vulture was killed by its conspecifics, because the whole body of the vulture was not visible; this was because the other vultures were obscuring it from view. However, the observer saw one vulture crouching at the site that seemed almost incapable of flying and was very emaciated, suggesting that the vulture that became the prey might have also been exhausted when it was with this vulture. In addition, it seemed that the high-pitched cry that continued for about 20 min was not from a competitor, but the scream of the vulture. Somehow, the reduction of food resources might have increased intraspecific competition, and hence aggressiveness, leading to killing and consuming a conspecific (Lecea *et al.*, 2011).

Overall, the cannibalistic behavior reported here, together with results from previous studies conducted on other raptor species, indicates that when food resources are scarce during wintering, vultures may become vulnerable to dehydration and to predation by conspecifics.

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