Brown bear Ursus arctos scavenging patterns

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SHORT COMMUNICATION

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Brown bear *Ursus arctos* scavenging patterns

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The brown bear *Ursus arctos* L. has long been believed to skin its prey and to leave behind a large hide and an unmolested skeleton. Camera monitoring in nature and observations in zoos revealed that carcasses were skinned and the skeletons cleaned by scavenging birds, mainly ravens *Corvus corax* and golden eagles *Aquila chrysaetos*. These results have implications for the estimates of brown bear densities, supposed damage and compensation.

Key words: Brown bear, Ursus arctos, raven, Corvus corax, jay, Garrulus glandarius, hooded crow, Corvus corone cornix, golden eagle, Aquila chrysaetos, fox, Vulpes vulpes, eating pattern, scavenging behaviour, South Norway

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The presence in nature of large hides and intact skeletons of prey animals, particularly sheep, has been attributed to brown bear *Ursus arctos* L. predation. Couturier (1954) described in detail how brown bears in the Pyrenees handled dead sheep, stating that an intact hide was left behind together with a neatly cleaned skeleton. Similar notions about how bears consume their prey have been recorded from different parts of Norway; some of these antedate Couturier's book. Thus, the presence of large hides and intact skeleton has been used to establish the presence of bears.

However, observations of carcasses in Norway carried out by the primary author have led to questioning of the validity of the criteria described above. No other signs typically indicating the presence of bears could, however, be observed in the vicinity of some cleaned carcasses (Elgmork 1982). This led to some doubt as to whether these carcasses had been left by bears. Therefore, a project was initiated which included photographic monitoring of carcasses in nature and observations of the behaviour of brown bears in zoological gardens. A more detailed account including several pictures is presented in Norwegian in Elgmork & Tjørve (1986).

Methods

Photographic surveillance of carcasses was made with common super-8 film cameras attached to electronic advance units which monitored the activity around the carcasses by automatic exposure every three minutes in daylight and every twelve minutes in darkness using flash. The distance from carcass to camera varied between 10 and 20 m with a restricted angle of view covering only a few metres on each side of the carcass. By this method even small birds such as tits *Parus* spp. were recognisable; these were, however, not included in the study.

Experiments with photographic monitoring were made mostly in autumn and spring in different parts of south-central Norway, particularly in the Vassfaret area (Elg-

Table 1. Frequencies (in %) of species according to the relative number of frames in which the species occurred.

Species	Relative occurrence in %
Raven *Corvus corax*	44.6
Jay *Garrulus glandarius*	20.2
Hooded crow *Corvus corone cornix*	16.2
Fox *Vulpes vulpes*	6.8
Magpie *Pica pica*	5.2
Golden eagle *Aquila chrysaetos*	3.1
Badger *Meles meles*	3.0
Other species	0.8

mork 1994), as well as on the west coast. Altogether the carcasses of 24 sheep and 3 roe deer *Capreolus capreolus* were placed in different types of environments. The carcass sites were visited once a week to change batteries and films, and to record the condition of the carcasses. The number of identifiable pictures taken during 1979-83 was 218,591.

In a zoological garden in Norway and another in Sweden, brown bears were given intact dead sheep and roe deer. The bears were starved a day or two before the carcasses were given to them. In total, we studied the behaviour of seven different bears devouring two sheep and one roe deer. The age of the bears ranged from 1.5 to 16 years.

Results

Photo survey in nature

In total, 20,480 observations of identifiable predators and scavengers were made. The frequencies of species based on the relative number of frames in which a species occurs on a carcass were recorded (Table 1).

Based on the number of frames, birds were the most important scavengers accounting for ca 90% of the activity around the carcasses. Both ravens *Corvus corax* and golden eagles *Aquila chrysaetos* were able to penetrate the skin of intact, unmolested dead sheep or roe deer. Both hooded crows *Corvus corone cornix* and jays *Garrulus glandarius* participated in the late stages of the eating process. In an experiment undertaken near the timberline in the Vassfaret area in south-central Norway, a sheep was eaten by scavenging birds in the course of five weeks (Fig. 1).

Scavenging birds are capable of eating carcasses in a way which leaves behind relatively large hides with a smooth inner side and straight edges. In some instances, the remnants may be covered by portions of the hide varying from large parts to thin belts. The skeleton was cleaned of muscles and connective tissue little by little, but the skeleton itself was not molested; except for the displacement of some of the ribs it was left undamaged.

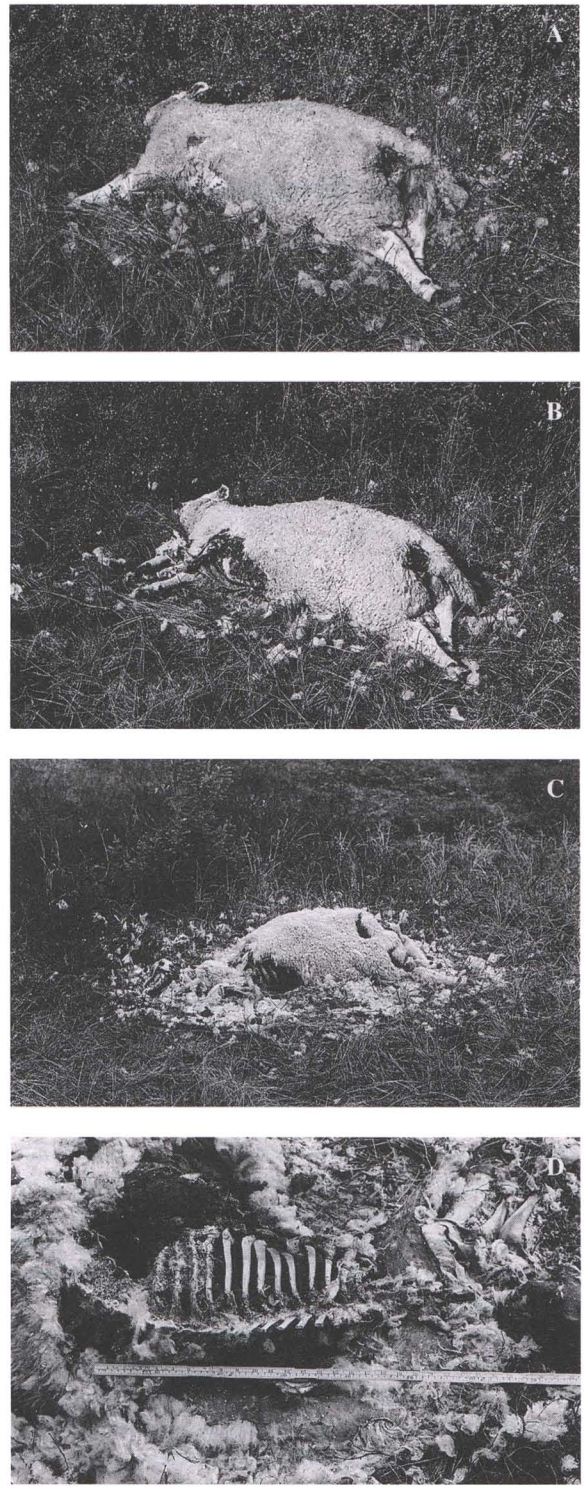

Figure 1. Serial presentation of a sheep carcass from camera experiments in south-central Norway initiated on 3 September 1980; A) 10 September, B) 21 September, C) 5 October and D) 14 October.The results are based on 5,918 exposures with 497 observations of scavenging golden eagles (45%), hooded crows (41%) and ravens (14%). The carcass was opened by a golden eagle.

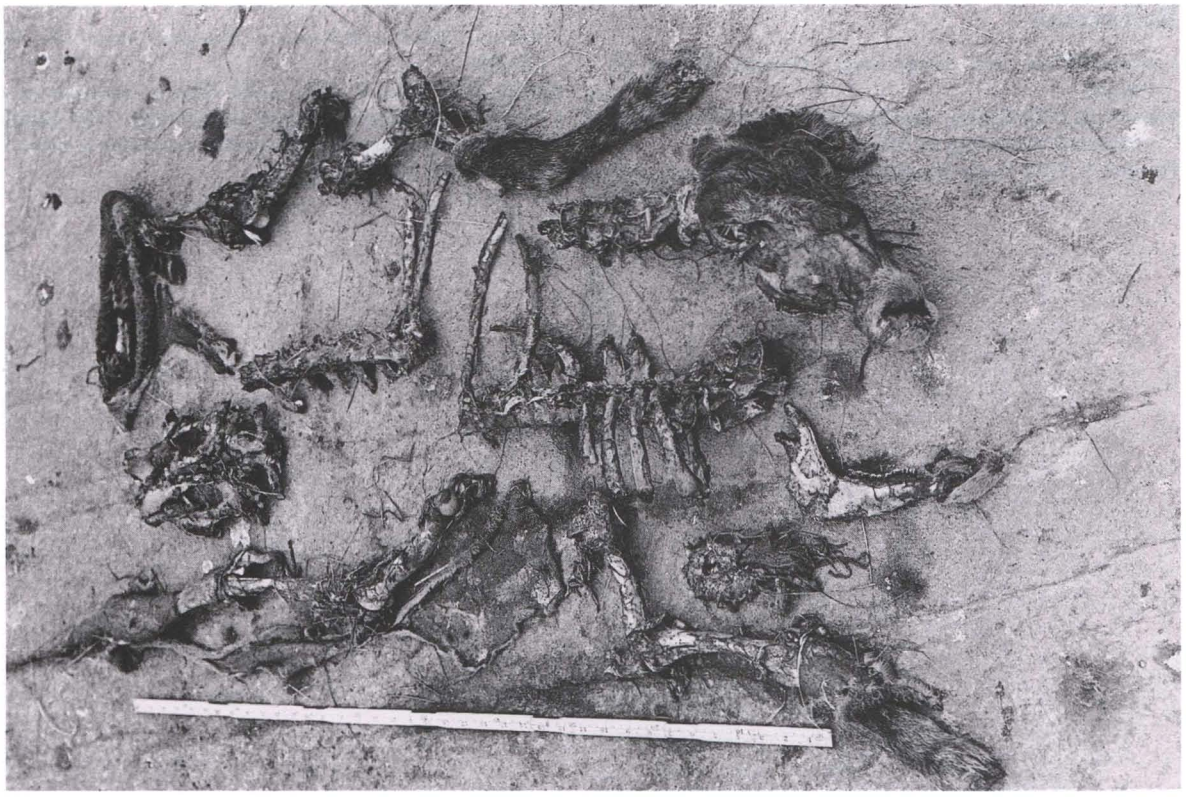

Figure 2. Remnants of a sheep having been eaten of by two bears for five days in a zoo in October 1979.

Intact hides and skeletons are dependent upon the absence of red foxes *Vulpes vulpes* around the carcass. The largest intact hides were produced from carcasses scavenged by many birds over a short period of time shortly after the carcass had been dumped.

Observations in zoological gardens

A large, 70-kg female sheep was given to two adult brown bears in October 1979, a 17-year-old male and a younger female kept together in a zoological garden near Oslo. The sheep was eaten by the two bears in the course of five days. In the experiment, the bears penetrated the abdomen and in later phases bit off many of the bones even including parts of the vertebral column. In the beginning of the eating process, the bears leave large pieces of hide intact, but later the skin may be thoroughly fragmented (Fig. 2).

When handling and eating the sheep, the bears primarily used their mouths. They only used their forepaws to hold the skin aside or to hold on to the sheep when tearing off parts with the mouth. The bears never made any movements with the forepaws that could be interpreted as an attempt to strip off the hide. After about five days of eating the hide had been torn into pieces and the bones cracked and fractured (see Fig. 2).

Another experiment was performed with three brown bears almost 1.5 years-old. These young bears also used their mouth only while feeding and did not make any movements that could resemble an attempt to strip off the skin.

Discussion

Experiments in nature and with captive bears indicate that the hypothesis that the brown bear actively strips off the hide of its prey and neatly cleans the skeleton as indicated by Couturier (1954) and others is untrustworthy. By being presented in the much quoted text book of Couturier (1954) this unfounded notion has been widely distributed. It may also have influenced the management of the brown bear in many countries. Based on this criterion, compensation was paid, for instance, for more than 400 dead animals in the county of Hordaland on the Norwegian west coast, alone, in 1976. This erroneous concept has thus led to exaggerated ideas both about the number of bears and the damage to livestock.

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References

Couturier, M.A.J. 1954: L'Ours brun. - Grenoble, 904 pp. (In French).

Elgmork, K. 1982: Caching behavior of brown bears (Ursus arctos). - Journal of Mammalogy 63: 607-612.

Elgmork, K. 1994: The decline of a brown bear Ursus arctos L. population in central south Norway. - Biological Conservation 69: 123-129.

Elgmork, K. & Tjørve, E. 1986: Intakte skinn og beingrinder etter åtseleteres avspisning av kadavre (In Norwegian with English summary: Intact fells and skeletons after scavenging in nature).- Fauna 39: 103-110.