Belg. J. Zool., 139 (1) : 79-80 January 2009

SHORT NOTES

The killing technique of Eurasian lynx

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KEY WORDS : *Lynx lynx*, Felidae, killing behaviour, predation, Slovenia

Killing techniques differ among different groups of carnivores. Since felids are mostly solitary hunters, each bite must be made with precision, and must be positioned to kill the prey as soon as possible to avoid possible risks to the predator during the struggle (1). It has been previously reported that felids kill mainly by suffocation caused by a bite into the throat or muzzle, or by severing the spinal cord with a bite into the nape (2-5). Leyhausen (3) noted that the throat bites are more likely when killing larger prey.

Eurasian lynx (*Lynx lynx* Linnaeus, 1758) and the grey wolf (*Canis lupus* Linnaeus, 1758) are the main predators of ungulates in Europe. When attacking large prey, the lynx usually kills it with a neck bite, either from below, or from above into the nape (6; 7). So far the majority of authors have reported that when biting from below, the lynx suffocates its prey by biting its throat or windpipe (6-10). Suffocation by means of a bite on the larynx was also reported as a killing technique for the Iberian lynx (*Lynx pardinus* Temminck, 1827) when hunting ungulates (11).

In this paper we present preliminary results from an ongoing study on the ecology of the Eurasian lynx in the Dinaric Mountains in Slovenia. The lynx there hunt mainly roe deer (*Capreolus capreolus* Linnaeus, 1758), red deer (*Cervus elaphus* Linnaeus, 1758), fat dormouse (*Glis glis* Linnaeus, 1766) and to a lesser extent other rodents, chamois (*Rupicapra rupicapra* Linnaeus, 1758), red fox (*Vulpes vulpes* Linnaeus, 1758), and birds (KROFEL, unpublished data[1]). Two other species of large carnivore are also present in the study area; the brown bear (*Ursus arctos* Linnaeus, 1758) and the grey wolf.

We determined the method of killing through autopsy of lynx prey remains. We searched for wounds made by canines and claws inflicted premortem on the outer and inner side of the skin. We also inspected all deeper injuries and recorded their exact location using veterinary anatomical atlases (12; 13).

In 13 cases (ten roe deer, two red deer, and one chamois), the prey remains were found early enough for the bite marks to be studied. In all the cases lynx killed their prey with a bite in the neck region. In eight (62%) instances, the bite was from the ventral side of the neck only, in three (23%) cases only from the dorsal side, and in two (15%) cases bite marks could be distinguished on both sides of the neck.

In nine cases we performed a more detailed autopsy of the region with the bite marks. In five out of the six cases (83%) where the bite was delivered from the ventral side, we could find injuries in the region of the common carotid artery (a. carotis communis) and the truncus vagosympathicus (Fig. 1). In three out of these five cases the laryngeal cartilages and/or windpipe were damaged. In only one case the injuries inflicted by teeth were restricted to the windpipe.

Our observations indicate that, when biting from below, the bite into the throat causing suffocation might not always be crucial for the killing of a large prey by a lynx. The injuries observed in regions other than the throat could have been inflicted incidentally when the lynx missed the windpipe or larynx, but it is also possible that the lynx intentionally aimed for some other vulnerable points. The latter is not unlikely, as it is possible that the bites into the region of the common carotid artery and truncus vagosympathicus could accelerate death of the prey. It is known from forensic studies on humans that pressure on the carotid sinus (located at the origin of internal carotid artery near the end of lower jaw), which contains numerous baroreceptors, can result in bradycardia or in a total cardiac arrest and immediate death (14; 15). This mechanism of death is known as vagal inhibition, reflex cardiac arrest or carotid sinus reflex. Unfortunately, we could not find any data about this mechanism in other mammals, but we assume that it can also occur in other species, including lynx prey. If the lynx is indeed taking advantage of this reflex death in its killing technique, this would be beneficial for the predator, as it would shorten the struggle with the prey and in turn decrease the chances for injury. Such injuries may not be negligible, as was for example indicated by high mortality sustained by cougars during hunting (16).

[1] KROFEL, M. (2006). *Plenjenje in prehranjevanje evrazijskega risa (*Lynx lynx*) na obmoju Dinarskega krasa v Sloveniji, graduation thesis*. Dept. for Biology, University of Ljubljana, Ljubljana.

Fig. 1. – Female roe deer (*Capreolus capreolus*) killed by Eurasian lynx (*Lynx lynx*) in Dinaric Mountains, Slovenia. Arrows indicate the bite marks. (Photo: Miha Krofel)

Further research is needed to confirm the possible role of reflex death in lynx killings and to determine how often lynx really do kill their prey with a bite to the throat when gripping the underside of the victim's neck. This would also enable us to evaluate the general belief that lynx and other felids kill mainly using suffocation caused by a bite into the throat, and to resolve whether this might only be the consequence of inadequate inspection of prey remains in previous studies.

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Received: April 2, 2007
Accepted: May 26, 2008