The Canadian Field-Naturalist Skeletal Injuries of an Adult Timber Wolf, Canis lupus, in Northern

Article *in* The Canadian Field-Naturalist · June 2019

T. L Hillis
Arctic Research Foundation

Christopher G. Blomme
Laurentian University

Frank Mallory
Laurentian University

Skeletal Injuries of an Adult Timber Wolf, *Canis lupus*, in Northern Ontario

FRANK F. MALLORY, T. L. HILLIS, C. G. BLOMME, AND W. G. HURST

Department of Biology, Laurentian University, Sudbury, Ontario P3E 2C6

Mallory, Frank F., T. L. Hillis, C. G. Blomme, and W. G. Hurst. 1994. Skeletal injuries of an adult Timber Wolf, *Canis lupus*, in northern Ontario. Canadian Field-Naturalist 108(2): 230–232.

The carcass of an adult male Wolf (*Canis lupus*), snared in late December in Waldey Township, was recovered and the skull cleaned. Upon examination it was evident that the animal had suffered a comminuted fracture of the left mandible. Upon further examination other injuries were noted. All injuries were in the process of healing.

Key Words : Timber Wolf, *Canis lupus*, skull injuries, northern Ontario.

Any time a wolf attempts to capture prey larger than itself, it places itself in a hazardous position. Reports of nonfatal injury to wolves by prey are infrequent because of the inability to observe such occurrences (Mech 1970; Mech and Nelson 1989). Some incidents of injury as a result of prey encounters have been observed (Stanwell-Fletcher and Stanwell-Fletcher 1942; Mech 1970; Frijlink 1977; Gray 1987; Mech and Nelson 1989) or are reported from collection of carcasses for other purposes (Young and Goldman 1944; Rausch 1967; Nelson and Mech 1985; Mech and Nelson 1989; Pasitschniak-Arts et al. 1988; Hillis 1990). Traumatic injuries to the lower jaw may result from bullet wounds, physical injuries or hunting confrontation with big game. These injuries may be seen in a healed state well after the initial impact has occurred (Pasitschniak-Arts et al. 1988). This note reports on an incident of a wolf injured by a severe impact, by the nature of the injury, suspected as a blow by a Moose, *Alces alces,* in northern Ontario.

An adult male wolf was snared in late December in Waldey Township, approximately 90 km southwest of Sudbury, Ontario. Observations at the site indicated that it was a member of a pack frequently seen at a bait-set and that it was having difficulty feeding. Tracks other than its own were observed at the snare site and the animal appeared in good condition (W. G. Hurst, personal communication). A post mortem examination showed that although lacking subcutaneous fat reserves (visual fat index = 2; Kirkpatrick 1980) both the marrow and fur were in good condition

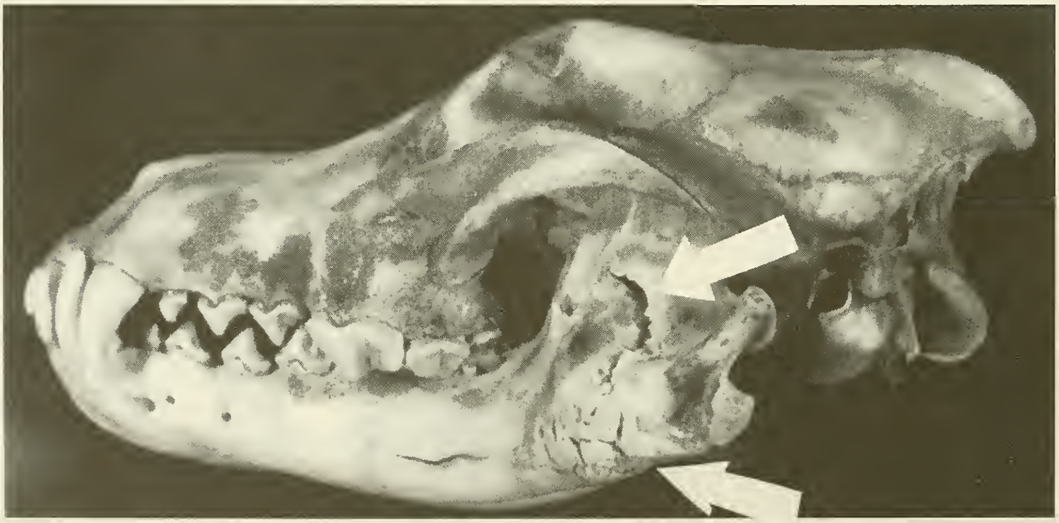

FIGURE 1. Skull of wolf showing comminuted fracture of the left mandible with the major fracture line travelling through the ramus cranial to the coronoid process.

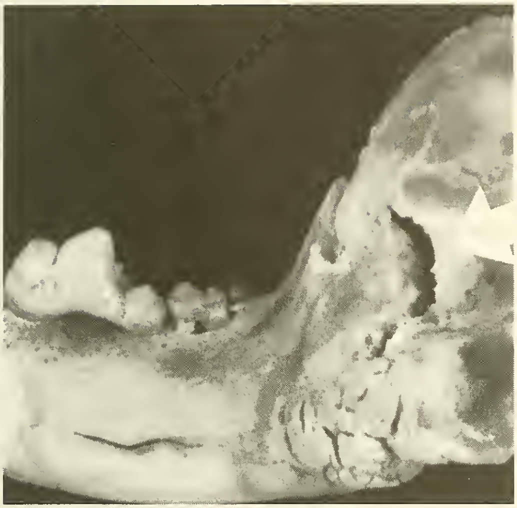

FIGURE 2. Angle showing oblique fracture travelling cranially along the body of the mandible to the level of the third premolar tooth and then travelling dorsal and ventral at the level of the carnassial tooth .

(W. G. Hurst, personal communication) ruling out any indication of starvation at this point.

A post-mortem inspection of the wolf's skull was conducted by R. H. Jouppi at the Walden Animal Clinic in Lively, Ontario. Results of the examination indicated that the animal had suffered a comminuted fracture of the left mandible with the major fracture line travelling through the ramus cranial to the coronoid process (Figure 1). This fracture site appears to have occurred at least four weeks prior to death because of the extensive osteophyte production and the formation of a large periosteal callus. The fracture site was, however, probably less than four weeks of age since the fracture line was still not fully healed with new bone and much of the fixation consisted of cartilage: nous and cancellous type bone.

There was also an oblique fracture travelling cranially along the body of the mandible to the level of the third premolar tooth and then travelling dorsal and ventral at the level of the carnassial tooth (Figure 2). These lines were healing with a minimum of periosteal callus, showing that they were being held more rigidly than the main fracture through the ramus.

The large fracture through the ramus may have had some infection (osteomyelitis) present. The fracture was healing with a minimum of mediolateral overriding and alignment seems conducive to appropriate function. The cranial root of the second molar was also fractured, which may have occurred at the time of the initial injury.

Whether or not the animal may have recovered fully cannot be disclosed from information provided; however, the fractures were healing and alignment of the lower jaw was evident. Such damage to skulls is relatively high; Phillips (1984) reported a frequency of 22 % cranial injuries due to blows by hooves of prey; Rausch (1967) also reported numerous skulls (25%) with compression fractures . Mech (1970) hypothesized that inexperienced pups would stand a higher chance of being injured; however, from the reported incidences of wolf injuries it appears that adults (specifically adult males) have a higher chance of injury (Pasitschniak-Arts et al. 1988; Mech and Nelson 1989; Weaver et al. 1992; L. D. Mech, personal communication). This may further support the theory that males have first contact with prey, being, therefore at higher risk (Hillis and Mallory *in press*; L. D. Mech, personal communication). The observations made in this report may further support the theory that during the critical period following a severe injury wolves are dependent on other pack members for food and the social nature of wolves facilitates the survival of wounded individuals (Rausch 1967; Pasitschniak-Arts et al. 1988).

Acknowledgments

We thank Mary Roche for her photographic assistance and F.C. Clulow for reviewing the manuscript. R. H. Jouppi of the Walden Animal Clinic, Lively Ontario, confirmed the injuries to the skull.

Literature Cited

Frijlink, J. H. 1977. Patterns of wolf pack movements prior to kills as read from tracks in Algonquin Provincial Park, Ont., Canada. Bijdragen Tot de Dierkunde 47(1): 131–137.

Gray, D. R. 1987. The muskoxen of Polar Bear Pass. Fitzhenry and Whiteside. Markham, Ontario. 191 pages.

Hillis, T. L. 1990. Demography and Ecology of the Tundra Wolf, *Canis lupus,* in the Keewatin District, Northwest Territories. M.Sc thesis, Laurentian University. Sudbury, Ontario. 128 pages + appendices.

Hillis, T. L., and **F. F. Mallory.** *In press.* Sexual dimorphism in wolves, *Canis lupus,* of the Keewatin District, Northwest Territories, Canada. Canadian Journal of Zoology.

Kirkpatrick, R. L. 1980. Physiological indices in wildlife Management. Pages 99–112 *in* Wildlife Management Techniques Manual Fourth Edition, *Edited by* S.D. Schemnitz. Wildlife Society, Washington, D.C. 686 pages.

Mech, L. D. 1970. The Wolf : The Ecology and Behavior of an Endangered Species. University of Minnesota Press, Minneapolis, Minnesota. 384 pages.

Mech, L. D. and **M. E. Nelson.** 1989. Evidence of prey-caused mortality in three wolves. American Midland Naturalist 123: 207–208.

Nelson, M. E., and **L. D. Mech.** 1985. Observation of a wolf killed by a deer. Journal of Mammalogy 66(1): 187–188.

Pasitschniak-Arts, M., M. E. Taylor, and **L. D. Mech.** 1988. Note on skeletal injuries in an adult Arctic wolf. Arctic and Alpine Research 20(3): 360–365.

Phillips, M. K. 1984. The cost to wolves of preying on ungulates. Appendices and Abstracts. Joint Meeting of the American Society of Mammalogy and the Australian Society, Sydney. Australian Mammalogy 8: 99.

Rausch, R. A. 1967. Some aspects of population ecology of wolves, Alaska. American Zoologist 7: 253–265.

Stanwell-Fletcher, J. F., and **T. C. Stanwell-Fletcher.** 1942. Three years in the wolves' wilderness. Natural History 49(3): 136–147.

Weaver, J. L., C. Arvidson, and **P. Wood.** 1992. Two wolves, *Canus lupus,* killed by a moose, *Alces alces*, in Jasper National Park, Alberta. Canadian Field-Naturalist 106(1): 126–127.

Young, S. P., and **E. A. Goldman.** 1944. The wolves of North America. American Wildlife Institute. Washington, D.C. 385 pages.

Received 27 September 1993
Accepted 17 February 1994

Problem-solving by a Foraging Wild Red Fox, *Vulpes vulpes*

PETER D. OMMUNDSEN

Department of Environmental Sciences, Selkirk College, Castlegar, British Columbia V1N 3J1

Ommundsen, Peter D. 1994. Problem-solving by a foraging wild Red Fox, *Vulpes vulpes*. Canadian Field-Naturalist 108(2): 232–233.

Problem-solving by the Red Fox (*Vulpes vulpes*) has been demonstrated in the laboratory but has rarely been observed in the wild. I describe here an example of problem-solving behaviour in a wild Red Fox foraging for Arctic Ground Squirrels (*Spermophilus parryii*) in a natural environment.

Key Words: Red Fox, *Vulpes vulpes*, behaviour, foraging, problem-solving, reasoning.

Knowledge of food procurement adaptations of carnivores is important to the study of community ecology and optimal foraging theory. Species-specific foraging strategies may determine competitive interactions in resource-limited environments (Pyke 1984; Hanson 1987; Theberge and Wedeles 1989; Paquet 1992). The Red Fox (*Vulpes vulpes*) commonly hunts by stalking and pouncing, but may execute a high-speed charge (Dekker 1983; Henry 1986). A typical predator kill may be characterized as a stimulus-response-reinforcement sequence (Cheney 1982). However, the Red Fox and other canids also occasionally exhibit problem-solving behaviour. Problem-solving refers to novel and extrapolative behaviour, also termed elementary reasoning, means-end reasoning, high-order behaviour, purposeful behaviour, insight behaviour, foresight behaviour, and cognitive vs. instinctive behaviour (Fox 1971; Molodkina et al. 1978; Frank and Frank 1982).

Although there exists laboratory evidence for problem-solving by the Red Fox (Molodkina et al. 1978), field evidence is scarce. Henry (1986) witnessed several episodes of predation in which a fox, after a failed pursuit, "waited", presumably sleeping or feigning sleep, until its prey ventured forth again. One wait lasted 12 minutes. He termed this manoeuvre the slumbering strategy. I report here a rarely observed foraging behaviour of the Red Fox which is a different example of problem-solving by a fox in a natural environment.

I observed the behaviour of a wild Red Fox hunting Arctic Ground Squirrels (*Spermophilus parryii*) in Denali National Park, Alaska. The sequence of events described occurred within a ten minute period beginning at 1220 h on 24 June 1973. The habitat was gently sloping tundra at 1200 m elevation, with a southern exposure (63°26′N, 150 17′W).

An adult Arctic Ground Squirrel was feeding on vegetation when a Red Fox approached the squirrel colony from afar. The fox charged the squirrel, which evaded the fox by running to a tunnel in the ground (hereafter termed the "entrance"). The fox stopped at the entrance and scanned the tundra. Within one minute the squirrel reappeared at another opening in the ground (hereafter termed the "exit") seven m from the entrance and within view of the fox. The fox retreated, and the squirrel emerged and returned to its feeding site. The fox rushed the squirrel a second time, with the same results. The squirrel safely reached the entrance, soon reappeared at the exit, emerged, and resumed feeding. The fox then rushed the squirrel a third time, but when the squirrel disappeared into the entrance, the fox altered course and ran directly to the exit, where it waited with mouth open. The squirrel promptly appeared at the exit, as it had on the two previous occasions, and was immediately captured by the fox. It appears as though the fox, unable to capture the squirrel by rushing it, solved the problem by devising a new strategy (interception) based upon observation of the squirrel's past behaviour.