

Pine Marten, *Martes martes*, as a Eurasian Beaver, *Castor fiber*, Lodge Occupant and Possible Predator

FRANK ROSELL and BJØRNAR HOVDE

Telemark College, Department of Environmental Sciences, N-3800 Bø, Norway

Rosell, Frank, and Bjørnar Hovde. 1998. Pine Marten, *Martes martes*, as a Eurasian Beaver, *Castor fiber*, lodge occupant and possible predator. *Canadian Field-Naturalist* 112(3): 535-536.

We trapped three adult Eurasian Pine Martens (*Martes martes*) at an earlier trapped-out Eurasian Beaver (*Castor fiber*) lodge in southern Norway. At another site, Pine Marten feces containing remains of beaver claws and hair were found outside a beaver lodge. Pine Martens apparently feed on beavers and use their abandoned lodges as resting sites.

Key Words: Eurasian Beaver, *Castor fiber*, Pine Marten, *Martes martes*, lodge, Norway.

Whereas Eurasian Pine Marten (*Martes martes*) and Eurasian Beaver (*Castor fiber*) co-habit the same ecosystems little has been reported on their relationship. This paper documents two independent interactions between these species.

In late December 1991 and early January 1992, we captured two male and one female adult martens at an earlier trapped-out Eurasian Beaver lodge in southern Norway (59°25'N, 09°03'E). At that time of year there had been an abrupt drop in temperature from + 2.8°C to -8.2°C (measured at 0700), and snow depths (3-15 cm) fluctuated greatly. Many Pine Marten footprints around the lodge the day before the first capture indicated that martens used it as a temporary resting site.

High thermal conductance raises the energetic costs of thermoregulation in *Martes* sp. (Iversen 1972; Worthen and Kilgore 1981; Buskirk et al. 1988; Harlow 1994). Both Pine Martens and American Martens (*Martes americana*) reduce energetic costs in winter by seeking insulated underground resting sites (Buskirk 1984; Buskirk et al. 1989; Brainerd et al. 1995). Resting in an abandoned beaver lodge may have provided Pine Martens with protection against cold weather.

In June 1997, we found a 25 cm diameter hole in the roof of another beaver lodge located 3 km from that previously described. The lodge had been occupied the previous winter by a beaver family. The entrances to the lodge were located under water. About 20 cm in front of the hole we found feces of a Pine Marten on a twig. The feces contained remains of beaver claws and hair. On the basis of the size and shape of the remains, the marten had fed on a one-

year-old beaver. No mud or twigs were found scattered outside the hole, which suggest that the beavers had somehow become trapped within its own lodge and had been forced to excavate a hole from within to get out. Fresh tooth marks on the twigs, inside the hole, supported this conclusion. A Pine Marten may have entered through this hole and either killed or scavenged the beaver.

The beaver's aquatic lifestyle and habit of constructing partially submerged lodges under masses of earth and sticks (Wilsson 1971; Zurowski 1992) has seemingly limited the number of its effective predators (Rosell and Parker 1996). Rosell et al. (1996) reviewed the causes of mortality in beaver (*Castor* spp.), but did not mention the Pine Marten as a possible beaver predator. Neither does Martin (1994) identify beavers as marten food items. Whereas in this observation it was not possible to confirm that Pine Martens prey on beaver, it does establish that martens visit beaver lodges and feed on this rodent. On the basis of size alone, we suggest that young beavers may be more susceptible to predation. Young beavers may be captured on land (Kile et al. 1996), or when left unprotected in lodges that are opened by the beaver themselves or by bears (*Ursus* spp.) (Tyurnin 1984; Smith et al. 1994). A drop in water levels can also expose lodge entrances and render young animals more vulnerable to predation.

Acknowledgments

We thank S. M. Brainerd, N. Fimreite and H. Parker for reviewing several drafts of our manuscript.

Literature Cited

- Brainerd, S. M., J. O. Helldin, E. R. Lindstrom, E. Rolstad, J. Rolstad, and I. Storch.** 1995. Pine Marten (*Martes martes*) selection of resting and denning sites in Scandinavian managed forests. *Annales Zoologici Fennici* 32: 151–157.
- Buskirk, S. W.** 1984. Seasonal use of resting sites by marten in south-central Alaska. *Journal of Wildlife Management* 48: 950–953.
- Buskirk, S. W., H. J. Harlow, and S. C. Forrest.** 1988. Temperature regulation in American marten (*Martes americana*) in winter. *National Geographic Research* 4: 208–218.
- Buskirk, S. W., S. C. Forrest, M. G. Raphael, and H. J. Harlow.** 1989. Winter resting site ecology of marten in central Rocky Mountains. *Journal of Wildlife Management* 53: 191–196.
- Harlow, H. J.** 1994. Trade-offs associated with the size and shape of American martens. Pages 391–403 in *Martens, sables and fishers: biology and conservation*. Edited by S. W. Buskirk, A. S. Harestad, M. G. Raphael, and R. A. Powell. Cornell University Press, New York. 484 pages.
- Iversen, J. A.** 1972. Basal energy metabolism of mustelids. *Journal of Comparative Physiology* 81: 341–344.
- Kile, N. B., P. J. Nakken, F. Rosell, and S. Espeland.** 1996. Red Fox, *Vulpes vulpes*, kills a European Beaver, *Castor fiber*, kit. *Canadian Field-Naturalist* 110: 338–339.
- Martin, S. K.** 1994. Feeding ecology of American martens and fishers. Pages 297–315 in *Martens, sables and fishers: biology and conservation*. Edited by S. W. Buskirk, A. S. Harestad, M. G. Raphael, and R. A. Powell. Cornell University Press, New York. 484 pages.
- Rosell, F., and H. Parker.** 1996. The beaver's (*Castor* spp.) role in forest ecology: a key species returns. *Fauna* 49: 191–211. [In Norwegian with English summary].
- Rosell, F., H. Parker, and N. B. Kile.** 1996. Causes of mortality in beaver (*Castor fiber* & *canadensis*). *Fauna* 49: 34–46 [In Norwegian with English summary].
- Smith, D. W., D. R. Trauba, R. K. Anderson, and R. O. Petterson.** 1994. Black bear predation on beavers on an island in Lake Superior. *American Midland Naturalist* 132: 248–255.
- Tyurnin, B. N.** 1984. Factors determining numbers of the river beavers (*Castor fiber*) in the European North. *Soviet Journal of Ecology* [in English] 14: 337–344 [Translated from *Ekologiya* number 6: 43–51].
- Wilsson, L.** 1971. Observations and experiments on the ethology of the European Beaver (*Castor fiber* L). *Viltrevy* 8: 115–266.
- Worthen, G. L., and D. L. Kilgore.** 1981. Metabolic rate of pine marten in relation to air temperature. *Journal of Mammalogy* 62: 624–628.
- Zurowski, W.** 1992. Building activity of beavers. *Acta Theriologica* 37: 403–411.

Received 14 November 1997

Accepted 16 March 1998