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Notes

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Using video traps, we tested the commonly held view that Mink, *Neovison vison*, are mostly nocturnal. We compared Mink passages during daylight and darkness in two habitats. Mink were significantly more nocturnal in uplands with streams and significantly more diurnal in wetlands. Assuming that uplands have a higher proportion of terrestrial prey active at night and wetlands have a higher proportion of aquatic prey, the observed difference in activity periods may be related to the difficulty of seeing aquatic prey at night and suggests a dynamic interaction between food visibility and diel activity in Mink.

Key Words: Mink, *Neovison vison*, diel activity patterns, video traps, wetlands, uplands, prey, New York.

Many authors report that Mink, *Neovison vison*, are mostly nocturnal, but diurnal activity has also been reported (Gerell 1969; Melquist et al. 1981; Birks and Linn 1982; Eagle and Whitman 1987; Zielinski 1988; Niemimaa 1995). We used video traps to record daytime and night-time passages of Mink in wetlands and uplands, and we compared passage rates between the two habitats.

Study Area

Four video traps were placed in each of four areas north and west of Rochester, New York (map in Haynes et al. 2007*); we classified two areas as "wetland" habitat and two as "upland/mixed" habitat. One wetland habitat was the 16 km^2 Braddock Bay State Wildlife Management Area, separated by narrow barrier beaches from Lake Ontario. The second wetland habitat was in the Iroquois National Wildlife Refuge and two connected state Wildlife Management Areas (77 km^2 total) located 50 km southwest of the Braddock Bay State Wildlife Management Area. One upland/mixed habitat (~ 35 km^2) surrounded Black Creek and some of its tributaries near the Bergen Swamp 34 km south of the Braddock Bay State Wildlife Management Area. The second upland/mixed habitat (~15 km^2) was centered 20 km west of the Braddock Bay State Wildlife Management Area, where two creeks drain into Lake Ontario.

Methods

The video traps were run from June 14 to October 28 in 2003 and from June 4 to October 20 in 2004. The video traps were operated for a total of 1665 trap-nights in wetland habitat and 1190 trap-nights in upland habitat.

The "MustelaVision" video trap system was designed to work day and night and to operate quietly and invisibly, in order to avoid disturbing the animals (see Haynes et al. 2007* for design and construction details). The system consisted of an electronic camera head (sensitive to both visible and infrared radiation) attached by a 50-foot cable to a two-head videocassette recorder powered by a 12-volt DC battery. During daylight, the camera monitored an area 3 m wide by at least 12 m deep (depending on camera angle relative to the ground). At night, the six infrared LEDs (always on) in the camera head provided a pool of illumination on the ground about 1 m wide by 2 m deep (again depending on camera angle). However, animals were detected up to at least 10 m from the camera at night due to eye shine and body heat against a cooler background. The camera head also included an infrared motion detector. When the sensor detected motion, the VCR started recording. Thirty seconds after motion ceased, the VCR stopped recording.

We placed the video traps near the edge of the water in wetlands or along streams in each area; the video traps were aimed at the edge of the water in and along which a Mink would move and sometimes at a tunnel through which the Mink would be forced to travel.

A "Mink passage" began when a Mink came into the field of view and the camera was triggered and ended 30 seconds after the Mink left, when the camera turned off. Thus, multiple passes in and out of the field of view before the camera stopped recording were recorded as one passage. Likewise, if the camera stopped and restarted while the animal remained motionless within the field of view, that was counted as one passage. In rare cases in which multiple Mink were recorded, their number was noted for that passage.

A Mink passage was recorded as occurring during "day" when natural light illuminated the entire field of view of the camera. A passage was defined as occurring at "night" when only objects illuminated by the camera's LEDs could be seen and the area outside that pool of illumination was dark. Because we had no way to date-stamp the recordings, we recorded the beginning and end dates of each recording session (usually one week long). These dates were used in calculating the duration of daylight as described below.

We summed day and night passages separately for all sites and for wetlands and upland/mixed sites over both years to get the total observed day and night passages. Using the null hypothesis that Mink have no preference for daylight or darkness, we calculated the number of passages expected during day and night based on the duration of daylight (U. S. Naval Observatory 2007*) during those weeks in which Mink passages were recorded. We then used a chi-square goodness-of-fit test to compare observed and expected passage numbers for day and night in each habitat to determine whether the Mink were nocturnal (more observed night passages than expected) or diurnal (more observed day passages than expected).

Results

A total of 225 Mink passages were recorded—136 in daylight and 89 at night. Only twice did we see obvious family groups consisting of a mother with young (at separate sites, one during day and one at night), and on two other occasions we saw two Mink travelling together in daytime, again at separate sites. The rest of the observations were of single Mink.

When data from all four areas were combined, the number of Mink passages observed in day and night did not differ significantly from the numbers expected if Mink showed no preference for daylight or darkness: 60.4% of the passages were recorded during daylight; during those weeks, 56.0% of the hours were daylight ($n = 225$, $\chi^2 = 1.776$, $P = 0.183$). However, when the data were separated into wetlands and uplands/mixed habitat, significant differences were obtained. The uplands/mixed habitat Mink were nocturnal: only 33.3% of the passages were recorded during daylight; during those weeks, 56.8% of the hours were daylight ($n = 21$, $\chi^2 = 4.724$, $P = 0.030$). In contrast, the wetlands Mink were diurnal: 63.2% of passages occurred during the daytime; during the weeks those passages were recorded, daylight hours comprised 55.9% of the total time ($n = 204$, $\chi^2 = 4.490$, $P = 0.034$).

Discussion

Our results showed that although upland Mink in our study were indeed nocturnal, wetland Mink showed a significant preference for daylight. Gerell (1969) observed that the availability of prey seemed to be the biggest factor affecting diel activity of Mink. Eagle and Whitman (1987) and Dunstone (1993) reported that Mink travel along the shore while foraging, and they enter the water to take aquatic prey only after they have spotted it from a vantage point such as a rock or log. Dunstone also noted that Minks' visual acuity in water is only about half that in air; therefore, more light is needed for aquatic than terrestrial hunting. Based on these observations, it is logical that Mink relying more heavily on aquatic prey would be more diurnal than Mink feeding on terrestrial prey.

Gerell's (1969) hypothesis is supported by Melquist et al. (1981), who concluded that the higher degree of nocturnal activity in the Mink they studied was a result of the nocturnal activity of small rodents such as meadow voles (*Microtus* spp.) and deer mice (*Peromyscus* spp.), a significant portion of the diets of those Mink. Further support comes from Niemimaa's (1995) report of the activity patterns of seven Mink he radiotracked in a sea archipelago in southwest Finland: two were diurnal, four showed no preference, and only one was nocturnal. Niemimaa concluded that these findings could be expected based on the availability of prey; during his study period in autumn and early winter, the main diet of the Mink was fish.

Although we did not study the diet of Mink, livetrapping data in our study area indicated that species richness and diversity and the abundance of the most common nocturnal small mammals in the area (Meadow Vole, *Microtus pennsylvanicus,* and White-footed Mouse, *Peromyscus leucopus*) were higher in upland habitats than in wetlands (Makarewicz et al. 2000*). If wetlands offer a greater variety and abundance of aquatic prey than uplands, then Mink in wetlands should consume more aquatic prey than Mink in uplands. If these assumptions are correct, our study further supports Gerell's (1969) hypothesis that activity patterns of Mink are influenced by those of their prey and that those patterns vary according to the availability of prey in different habitats.

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