OBSERVATIONS OF BROWN BEAR MOVEMENTS IN THE HARGITA MOUNTAINS, ROMANIA

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Bear populations differ in their movements and traveling behavior. Results of systematic observations of the brown bear (*Ursus arctos* L.) in the Romanian Carpathians over an extended period have not been previously published. Extremely favorable conditions permitted the identification and observation of individual bears over several years.

STUDY AREA

All observations were made on the western slope of the Hargita Mountains-East Carpathians in the vicinity of Bucin Pass, Varsag Valley, Liban Pass, Madas Peak, Ivo Valley, and the Korund Plateau. Approximately 400 km^2 in the headwaters of the Tirnava Mare River and its tributaries were intensively searched for evidence of bears. The elevation of the study area ranged 700–1600 m and encompassed beech (*Fagus* spp.) and spruce (*Picea* spp.) forests. The area is sparsely populated.

METHODS

Between 1979 and 1981 I was able to identify 21 bears attending 1 baiting station. Total observation time exceeded 3,000 hours; more than 400 hours were spent observing several bears at the same time. These direct observations were supplemented by examining tracks of bears visiting the feeding site. Tracks were followed to determine travel routes, distances traveled, and location of resting places. Most observations were made at distances of less than 150 m. Photographs and 8-mm and 16-mm film were also used for identification and to describe motor activities.

RESULTS AND DISCUSSION

Trails

Bears traveled through their home ranges on clearly developed trail systems. Bear trails generally were the shortest distance between feeding and resting areas, apparently offering security and ease of travel. Undisturbed bears regularly used these trails for most of their travel. Parts of trails, especially near preferred feeding sites, were frequently used by several bears concurrently. Up to 12 bears were observed on a single trail during 1 afternoon. Main trails were clearly distinguishable. Trails usually intersected in thickets, which were sometimes dissected by a trail network.

Bears used trails with a certain punctuality. The 1st bears that appeared on a path, beginning in the afternoon, were young animals. They moved cautiously, stopping frequently to sense their surroundings. After 1 bear traveled the route, others moved more confidently, hesitating less than the 1st traveler. Before a bear walked into an exposed area, it often paused for more than 20 min to evaluate the situation.

Territorial Behavior

Lindemann (1954 in Meyer-Holzapfel 1957), Almasan et al. (1963), Negrutiu and Cazacu (1979), and Rosler (1984) considered trees scratched by bears and bark peeled from trees along trails as indications of territorial marking, but Craighead (1972) and Herrero (1972) did not agree. I concur with the later opinion because I did not find scratch sign along the trails but did observe it near feeding sites. Bark stripped from trees was regularly consumed. Lindemann (1954) and Rosler (1984) argue that special defecation sites exist that are important in olfactory marking of home ranges. My observations do not confirm this. I found that bears defecate throughout their home range, with scats concentrated where bears linger, such as feeding and resting sites, and along the border of thickets where they hesitate before entering exposed areas. In the later situation, defecation appears to be spontaneous, perhaps as a nervous response, and certainly not as a result of examining existing scats. I also noticed that bears defecate while fleeing, particularly at the beginning of flight, with excrement being spread over 1.5 m.

I am not entirely convinced that scats are not used as territorial markers; if they are, they are of little importance. I observed bears pass fresh scats of other bears without reaction, though Negrutiu and Cazacu (1979) made a contrary observation. I considered indifference to be the norm, with changes only during

the breeding season, when the scats and urine of females were examined intensively. Even then I did not observe that scats and urine were deposited at specific sites.

Resting Sites

Resting places used during the day were rarely found within 2 km of feeding sites or baiting stations but were 4–6 km distant. Similar observations were made by Negrutiu and Cazacu (1979) and Roth (1983). Older bears seemed to travel greater distances between resting and feeding sites than younger bears, although this was not true of a bear that was feeding on livestock. Several people testified that large older bears remain near a kill or carcass and become aggressive when disturbed.

Bears have no permanent resting places. I observed that only in spring would the same thicket be used for several days, usually by animals that came to the baiting station.

Movements

An undisturbed midsized bear walks at a speed of 5.5–6.0 km/hour, including periodic stops to evaluate its surroundings. While stopped, a bear often stands on its hind legs; certainly most young animals do. When trotting, bears travel at an average speed of 10–12 km/hour. I observed this pace being maintained for 420 m. A bear gallops relatively slowly and only over short distances. A midsized bear galloped 34 m in 5.4 sec, covering that distance in 12 bounds. Each bound covered 2.6–2.9 m. This means the bear reached a speed of 22.3 km/hour. Another midsized bear, whose bounds covered 2.8–3.2 m, traveled 11.2 m in 0.79 sec in 4 bounds, thus reaching a speed of 50.9 km/hour. This speed was maintained for only 4–10 bounds, over a distance of 10–25 m, followed by a considerable decrease in speed. This is the greatest speed we recorded, and it is close to that mentioned by Hofstra (1982) for black bears (*U. americanus*).

Long-range movements occurred after preferred foods were depleted or after feeding at the baiting station stopped (Almasan et al. 1963, Almasan 1967, Daneti 1970, Negrutiu and Cazacu 1979, Georgescu 1980). It is significant that the optimal feeding sites and baiting stations were always adopted first by young bears, which also remained the longest time. This does not agree with Pulliainen et al. (1984), who observed that older bears dominated such situations.

Home Ranges

Although our observations are fragmentary, home ranges of young bears appeared to be considerably smaller than those of adult animals. The longest excursions were made by adult males. Midsized bears, male and female, are the most mobile. Bears observed at baiting stations were located up to 17 km away, thus exceeding the distances reported to be traveled by bears in the Alps (Roth 1983). Long-range movements of 120–150 km are known for the Carpathian bear (Daneti 1970, Negrutiu and Cazacu 1979).

Bears seemed to avoid forestry roads. The shortest distance between a feeding or daytime resting site and a little used forestry road was about 800 m.

My observations suggest that several midsized bears disappeared each year from the observation district while others appeared. The appearance of "new" large bears was infrequent. Females with cubs appeared to be the least mobile. These animals traveled distances not greater than 6–8 km. Late spring, the period of searching for food, and early winter, while moving to dens, appeared to be periods of maximum mobility. Generally, most bears withdrew to the higher mountain regions shortly before the 1st heavy snowfalls of winter.

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