Home Range of the Coyote in Western Tennessee

Jeffrey G. Babb, *Department of Biology, Memphis State University, Memphis, TN 38152*

Michael L. Kennedy, *Department of Biology, Memphis State University, Memphis, TN 38152*

Abstract: Home range of the coyote (*Canis latrans*) was studied in western Tennessee during 1985 to 1987. Using standard radio-telemetry techniques, annual and seasonal home ranges were determined. Annual home ranges averaged 31 km^2 for males and 60 km^2 for females. Home range size varied across seasons for both sexes. Females had larger ranges than males during all periods except the breeding season. Long-distance travel of 70 km and 55 km was recorded for 2 individuals.

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Coyotes (*Canis latrans*) occupy many diverse habitats throughout the continental United States and in many areas of Canada (Bekoff 1982). Although this species is found throughout the southeastern United States (Bekoff 1982, Hill et al. 1987), no wild *Canis*, other than occasional feral dogs and extremely isolated pockets of red wolves (*Canis rufus*), occurred in the southern states east of the Mississippi River from 1900 until about 1965 (Gipson 1978). Coyotes moved into this region during the 1960s and early 1970s. At present, little is known about the ecology of coyotes in this newly established portion of its range.

Bekoff (1977, 1982), Gipson and Sealander (1972), and Sumner et al. (1984) summarize much of the available literature on activity and movements of coyotes. However, with the exception of the work of Sumner et al. (1984), there are no reports of movement patterns and home ranges of coyotes in the recently colonized area east of the Mississippi River. Our objective was to estimate the home range of coyotes in a portion of this newly established range.

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Methods

Coyotes were captured on the MAAP (about 4 km southeast of Milan, Tennessee) and monitored on the MAAP and surrounding areas in Gibson and Carroll counties. Habitat throughout was primarily open pasture and agricultural fields interspersed with upland forest common to the area, mainly *Quercus* spp. and *Carya* spp. Pastures were mostly of fescue and other grasses and shrubs. The terrain consisted of gently rolling hills transversed by streams and associated riparian habitat.

Animals were caught using wire snares (Gregerson No. 4) and leg-hold traps (Woodstream soft-catch, No. 1.5 and No. 3 coil-spring) between 18 December 1985 and 8 January 1987. When set, snares and traps were checked daily, and captured animals were immobilized with ketamine hydrochloride and acetylpromazine. Captured animals were aged as yearling or adult following Nellis et al. (1978), sexed, and tagged in both ears with a metal ear tag, equipped with a radio-collar (200–300 g; Wildlife Materials, Inc., Carbondale, Ill.), and released at the site of capture.

Radio-collared coyotes were monitored over several full-night tracking sessions during each season and periodically (during both light and dark hours) to more completely describe movement patterns. Locations were obtained using hand held and aircraft-mounted receiving equipment, lithium-powered transmitters (motion sensitive), and standard radio-tracking procedures (Cochran and Lord 1963, Verts 1963, Smith et al. 1981). A location was determined by at least 2 intersecting bearings taken no more than 5 minutes apart. Recorded bearings were plotted on 1:24,000 scale U.S. Forest Service maps and later converted into grid coordinates. Based on conclusions of Laundre and Keller (1984), annual home range was calculated only for animals with $\geq$100 relocations. Because Laundre and Keller (1984) reported that 4 to 5 periods of 24-hour sampling (sequential relocations) seemed to adequately delineate home ranges of males and females in the pup-rearing season, coyotes that had been relocated more than 20 times (number of relocations selected arbitrarily) were used in determining seasonal home ranges. Seasons were defined as breeding (1 Jan–15 Mar), gestation (16 Mar–30 Apr), pup-rearing (1 May–31 Aug), and dispersal (1 Sep–31 Dec) following Smith et al. (1981). Home ranges were calculated for coyotes (those using the study site on a regular basis) using the minimum area method of Mohr (1947).

Results

Ten coyotes (5 M, 5 F) were monitored during the study. All males were adults at the time of capture, while 1 female was an adult and 4 others were yearlings. The number of radio-locations used to determine annual home ranges for 3 males and 2 females varied among individuals (N = 141 to 393); locations were taken from 17 to 59 nights throughout the study. Annual home ranges averaged 31 km^2 for males

(range = 14 km² to 43.3 km²) and 60 km² for females (range = 48 km² to 71 km²).

Nine coyotes (4 M, 5 F) were used to determine seasonal home ranges. The number of radio locations used to determine seasonal home ranges varied from 23 to 132. Female home ranges averaged greater than males during all seasons except the breeding season. Largest seasonal home range for males ($\bar{x}$ = 20 km²) and females ($\bar{x}$ = 27 km²) was during the dispersal season (male:range = 7.5 km² to 30.1 km², female:range = 8.2 km² to 45.5 km²); smallest home ranges for males and females were during the gestation season ($\bar{x}$ = 9 km², range = 4.2 km² to 16.7 km²) and breeding season ($\bar{x}$ = 11 km², range = 4.5 km² to 32.4 km²), respectively. Male home range size for the breeding season averaged 12 km² (range = 9 km² to 18 km²); female home range size for the gestation season averaged 18 km² (range = 3.5 to 24.5). Average home range sizes for the pup-rearing season for males and females were 14 km² (range = 4 km² to 29 km²) and 26 km² (range = 5.5 km² to 45.9 km²), respectively.

Long-distance travel (from the capture site) was recorded for 2 individuals. An adult male moved southward about 70 km and a yearling female approximately 55 km eastward.

Discussion

Previous studies relating to home range size of coyotes have produced a wide range of estimates. For example, Bekoff (1977) stated that the home ranges of male coyotes are generally larger than those of females. Andelt and Gipson (1979) reported average annual home ranges of male coyotes in Nebraska were slightly larger than those of females, ($\bar{x}$ = 28.2 vs. 24.2 km², respectively). Bowen (1982) reported that male and female coyotes in Jasper National Park, Alberta, Canada, had about the same average home range size (about 14 km²). However, he did not include the home range of one animal (an adult male) in his calculations because its range was so much larger than those of the other males in the study. Bekoff (1977) summarized several studies in which females had larger home ranges than males. In Mississippi and Alabama, Sumner et al. (1984) reported females had an average annual home range more than twice that of males ($\bar{x}$ = 41.2 vs. 20.0 km², respectively). Our results are similar to those of Sumner et al. (1984) with female ranges being larger than males.

Reasons for varying relationships between male and female ranges are uncertain. However, such differences probably are related to social organization within populations. Bekoff (1982) reported that home range size is influenced by social organization. He suggested that the level of control to which a population is exposed can affect social structure. Camenzind (1978) noted that there can be some plasticity in the social organization of free-ranging coyotes in relatively unexploited populations. Larger female home ranges may characterize unexploited populations such as those in newly colonized areas of the Southeast.

Little is known about seasonal variation in home range of coyotes. Previous

studies (Camenzind 1978, Andelt and Gipson 1979, Springer 1982) have reported varying sizes in seasonal home ranges. In our study, largest home range for both sexes (during the dispersal season) is probably best explained by increased activity in search of mates, as suggested by Springer (1982) and Laundre and Keller (1984). Additionally, because of the need for the male and female to feed the young as they mature (Bekoff 1977), it is not surprising to find home ranges during the pup-rearing season larger than those recorded for the breeding and gestation season. Similarity between male and female home ranges in the breeding season probably results because paired animals maintain companionship during this period. The greatest difference between the sexes was seen during gestation. After the breeding season, males showed a marked decrease in home range size while females showed a distinct increase. Explanations for such results are unclear. However, such behavior could be related to selection and preparation of dens. According to Young and Jackson (1951), pregnant coyotes begin cleaning out dens several weeks before the birth of the pups. She sometimes prepares $\geq$12 dens before whelping; dens may be close together or far apart.

Coyote populations tend to be dynamic and composed of individuals who remain for long periods of time in 1 region and others (e.g., an adult male and yearling female in our study) that seem to have a tendency to travel over large areas or leave their established home ranges. Bekoff (1977, 1982) summarized long distance movements by coyotes. These have ranged as great as 323 km (Andrews and Boggess 1978) and 544 km (Carbyn and Paquet 1986). The reasons for such behavior are unclear. Laundre and Keller (1984) reported long distance movements during any season and indicated this behavior may be related to mate selection during the dispersal season. They suggest that animals which exhibit this behavior during other times of the year are those which do not have a mate and are not involved with pup rearing.

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