J. Ethol. 1 : 109–111, 1983 *Short Communication*

Range Size and Activity Pattern of Three Nocturnal Carnivores in Ethiopia by Radio-Telemetry

Home range sizes and activity patterns of 3 nocturnal carnivores were studied in Omo National Park, Ethiopia. Two common genets (*Genetta genetta* (L.)), 1 white-tailed mongoose (*Ichneumia albicauda* (G. Cuvier)) and 1 black-backed jackal (*Canis mesomelas* Schreber) were radio-tracked from November 1981 to February 1982.

The Mui study area is situated beside the Mui river, 5 m in width, which flows from north to south. Riverine forest dominated by *Ficus* and *Tamarindes* trees covers the area of 10–100 m in width along with the Mui river. *Combretum* and Acacia bush (200–400 m in width) are next to the western side of the riverine forest, then savanna grassland with Acacia thicket extends further to the west. The eastern side of the river is hilly with *Combretum* and Acacia bush. This area was described in detail by Stephansen & Mizuno (1978) and Ikeda et al. (1982).

The animals were captured with tin box traps or leg-hold traps and anesthetized at the capture sites with Ketamine Hydrochloride (Ketalahl 50, Sankyo Pharm. Co. Ltd.). Radio-transmitters (hand made, 50MHz) were attached as a collar and the animals were released at the capture sites. Body measurements of the animals and period of radio-tracking are given in Tables 1 and 2. Genet no. 1 was lactating and genet no. 2 was inmature. Taylor (1969) reported that *Genetta* in Kenya have 2 breeding seasons; during May and from September to December.

Locations of the animals were obtained by triangulation with fixed 3-element Yagi antennas. Genet (no. 1), the jackal and the mongoose were radio-located every 30 min for 10 days from November 26 to December 5; their activities, as indicated by changes of signal intensity, were recorded continuously on an event recorder. The mongoose could be located until December 1, because the radio collar was dropped off its body. After December 8, these animals, including genet (no. 2), were radio-tracked twice each day, at midday and midnight.

The home ranges of the 2 genets and the mongoose throughout the tracking periods are shown in Fig. 1. Their home ranges extended along the Mui river from the north to the south including a wide area of riverine forest and bush area. The jackal's home range (Fig. 1) extended to savanna grassland on the western side of the study area and to the riverine forest of the Mui river on the east. Home ranges of 2 female genets closely overlapped with each other. Other than these common genets, 3 large spotted genets (*Genetta tigrina* (Schreber)) visited a feeding site in the front yard of the guest house after the radio-tracking periods. One female of them had been radio-tagged in 1978, and its range then (Ikeda et al. 1982) was within the home ranges of the 2 genets. Both common and large spotted genets appeared at the feeding site singly even when multiple observations were made in 1 night. Therefore the genet may forage as a solitary even though the home ranges do overlap.

Table 1. Body measurements of the animals.

	Sex & age	BW (g)	HBL (mm)	HFL (mm)	EL (mm)	TL (mm)
Genet no. 1	F (adult)	1550	488	78	29	421
Genet no. 2	F (immature)	1300	458	79	36	382
Jackal	M (adult)	6400	765	166	109	315
Mongoose	M (adult)	2600	541	109	36	373

BW; body weight, HBL; head and body length,
HFL; hind foot length, EL; ear length TL; tail length

Table 2. Radio-tracking periods and home range sizes of 3 nocturnal carnivores.

	Capture date	Tracking periods	Home range size (km^2)	References
Genet no. 1	Nov. 21	Nov. 26–Dec. 5	0.62	
		Dec. 8–Feb. 3		0.75 (Waster 1980)
Genet no. 2	Dec. 6	Dec. 8–Jan. 27	0.34	
Jackal	Nov. 23	Nov. 26–Dec. 5	3.99	7.2 km across (van der
		Dec. 8–Jan. 27		Merwe 1953)
Mongoose	Nov. 27	Nov. 27–Dec. 1	0.51	0.75 (Waser 1980)
				8.0 (Taylor 1970)

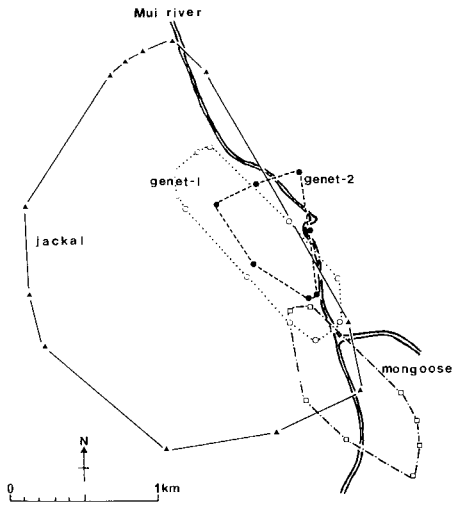

Fig. 1. Home ranges of common genets, black-backed jackal and white-tailed mongoose. Thick line shows the Mui river.

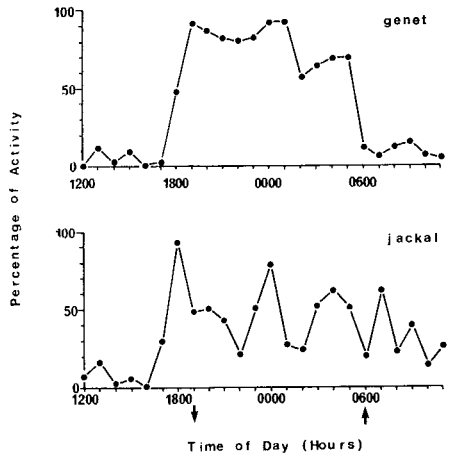

Fig. 2. Activity patterns of common genet and black-backed jackal. Arrows indicate light intensity at the 0 1x level after sunset and before sunrise.

Home range sizes obtained by polygon connecting the outermost located points are given in Table 2 with other findings. However the comparable data are scarce, home range sizes in the present study show good agreement with the other authers' findings except for black-backed jackal. Golden jackals (*Canis aureus* L.) have a home range of 2.56–23 km^2 (van Lawick-Goodall 1970) and 0.1 km^2 (Macdonald 1979).

The daily activity patterns of genet no. 1 and the jackal are shown in Fig. 2. The genet was strictly nocturnal and was active throughout the night; she started activity at sunset and ceased activity before sunrise. This pattern was similar to that of the large spotted genet (Ikeda et al. 1982), although the latter gradually reduced activity after midnight. Although the jackal was active at night, the activity pattern was quite different from that of the genet. There were 3 noticeable peaks of activity. This species appeared to be most active a little before sunset, with a second activity peak at midnight, and a third lower peak before sunrise. There was also a peak after sunrise. This repetition of active and inactive phases might be caused by prey activity, as reported for red fox (Ables 1969). In fact, we observed this species chasing dikdik in the morning (7:00 a.m., November 20).

Proportions of active time in the day are 54.9% for the genet and 36.7% for the jackal. The jackal forages on small vertebrates and invertebrates (Lamprecht 1978), while the genet depends on rodents, invertebrates and fruits for their food (Smithers 1971; Kingdon 1977). Such different food habits may reflect the differences in activity pattern and proportion of active time between the genet and the jackal.

Feeding behaviour of the genet and the mongoose was observed at the feeding site. When meat was hung on 1 m above the ground, genets fed on it by jumping, but mongooses did not pay any attention, and fed only on meat on the ground. When the meat was set in a tree above 1 m, genets climbed and fed on it as described by Taylor (1970) and Wemmer (1977). Digging behaviour was observed in mongooses as mentioned by Ikeda et al. (1982).

These 3 nocturnal species coexisted in the same habitat and were nocturnal. The jackal occupied a rather open habitat, while the genet and the mongoose occupied an area interspersed with trees and shrubs. Moreover, while the genet could display some arboreal behaviour, the mongoose was rather terrestrial. Difference in the foraging strategy among these 3 species, including their food habit, home range use and activity pattern, will allow them sympatric existence in the same savanna bushland.

Acknowledgements – We are grateful to the Addis Ababa University and Wildlife Conservation and Development Department, Ethiopia for their kind cooperation and arrangement to our study. We extend thanks to Dr. P. Waser for his critical reading of the manuscript. This study was supported by a Grant-in-Aid for Overseas Scientific Survey from the Ministry of Education, Science and Culture of Japan (No. 56041042, 57043038).

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(Received 14 July 1983 : Accepted 29 Aug. 1983)

J. Ethol. 1 : 111–113, 1983 *Short Communication*

Chimney Projecting Behaviour of Chironomid Larvae (*Chironomus yoshimatsui*; Diptera, Chironomidae)

The *Chironomus yoshimatsui* larva lives in polluted water. It builds a U-shaped dwelling tube of sediment particles glued with salivary secretion. In the tube, open at the sediment surface, it lives pumping a current of water to replace oxygen-depleted water by dorso-ventral undulation of its body. The larva feeds on the deposits around the entrance of the tube by extending the body out of either of the entrances (Fig. 1).

Usually it projects chimney-like structure as an extension of the dwelling tube on either or both of the entrances above the mud surface, but in the laboratory we sometimes observed that the larvae did not build chimneys at all (Fig. 2). Chimney projecting behaviour has been already described in the other species (*Chironomus anthracinus* Zett.) and its causal factor appeared to be low oxygen concentration (Berg 1938, cited in Jonasson & Kristiansen 1967). The experiment was carried out to know whether this applies to the case of *C. yoshimatsui*.

Fourth instar larvae of *C. yoshimatsui* reared from eggs in the laboratory were used in the experiment. The larvae were cultured at the density of 2 individuals /cm^2 (lower than that in the field condition) in 600 ml water in a tray, which was 15 cm x 20 cm wide and covered with mud 0.5 cm deep on the bottom. The culture was kept at 22°C and well aerated. Under this condition where a high DO level (about 80 % air saturation) was kept, larvae were uniformly distributed and projecting no chimney at all. At the start of the experiment the bottom area was halved into area A and B by the screen of cardboard, and while the area A was continuously supplied with air, the area B was supplied with nitrogen-gas at the same rate as the air flow in the area A.

Water was sampled with 5 ml syringe at two points in each area 10, 30 and 130 min after the onset of experiment. The oxygen content of the sampled water was determined by the Winkler method. The behaviour of larvae was observed at each water sampling (Fig. 3).

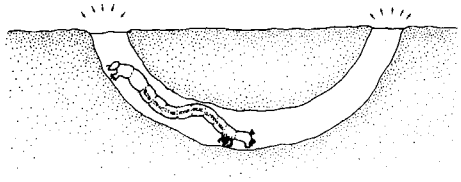

Fig. 1. Schematic presentation of the dwelling tube in a cross section.