Journal of the North Carolina Academy of Science, 118(3), 2002, pp. 206–209

CREPUSCULAR SURFACE FORAGING OF THE HAIRY-TAILED MOLE (*Parascalops breweri*)

GARY R. GRAVES

Department of Systematic Biology, MRC-116
National Museum of Natural History
Smithsonian Institution
Washington, D.C. 20013-7012

Key Words: Appalachian Mountains; crepuscular foraging behavior; North Carolina; Hairy-tailed Mole; *Parascalops breweri.*

The hairy-tailed mole (*Parascalops breweri*) is primarily fossorial (Eadie, 1939; Hamilton, 1939; Hallett, 1978; Jensen, 1986a,b). Its capture by dogs, cats, and owls, as well as accounts of moles crossing roads at night (Hamilton, 1939; Gordon and Bailey, 1963), provided circumstantial evidence that this species may forage or disperse on the surface. Hamilton's (1939) field experiments indicated that hairy-tailed moles were active throughout the day in their tunnel systems and showed several pronounced activity peaks between dawn and dusk. Neither the timing and duration of surface excursions nor the foraging behavior of free-living moles are known. Here I report the first observations of surface foraging behavior in the hairy-tailed mole and the southwesternmost record for the species in the Appalachian Mountains.

All observations were made in a roughly oval area (150 m^2) at the edge of a campsite clearing (500 m^2) in mixed deciduous-hemlock forest (canopy height, 20–25 m) on the narrow floodplain of Big Santeetlah Creek (35°20.7′N, 83°57.9′N; 840 m above sea level), a second-order tributary of the Little Tennessee River, in the Nantahala National Forest, Graham County, North Carolina. The clearing was sparsely vegetated with patches of short grass and sedge which trapped deposits of rain-washed humus, detritus, and weathered leaf litter. The floor of the surrounding forest was thickly carpeted with leaf litter. Floodplain soils were predominately sandy loams. A 400 m^2 circular area centered at the foraging site was inspected on 12 June 1998 and subsequently with a flashlight two or three times nightly (usually 22:00, 01:00, and 04:00 EST), and every 15 min from 06:00 to 07:00 and from 16:00 to 20:30, until the morning of 19 June. Periodically I swept away evidence of foraging and tamped down shallow subsurface tunnels in order to better monitor the mole's surface activity. Local 12 June sunrise and sunset (EST) was 05:20 and 19:51, respectively. However, ambient light levels were attenuated in the morning and afternoon because the site lies in a deep valley rimmed by ridges and balds.

I observed and videotaped presumably the same hairy-tailed mole on five occasions: 12 June (06:05–06:30), 14 June (06:37–06:55, 20:35–20:39), 16 June (20:05–20:43), and 17 June (17:05–17:06). Light rainfall occurred 0.2–12.0 hr before each sighting. The mole's surface activity was crepuscular during the brief study period. I observed no evidence of mid-day (09:00–16:00) or nocturnal (21:00–04:00 h) surface foraging. In all cases, the mole was actively foraging on the

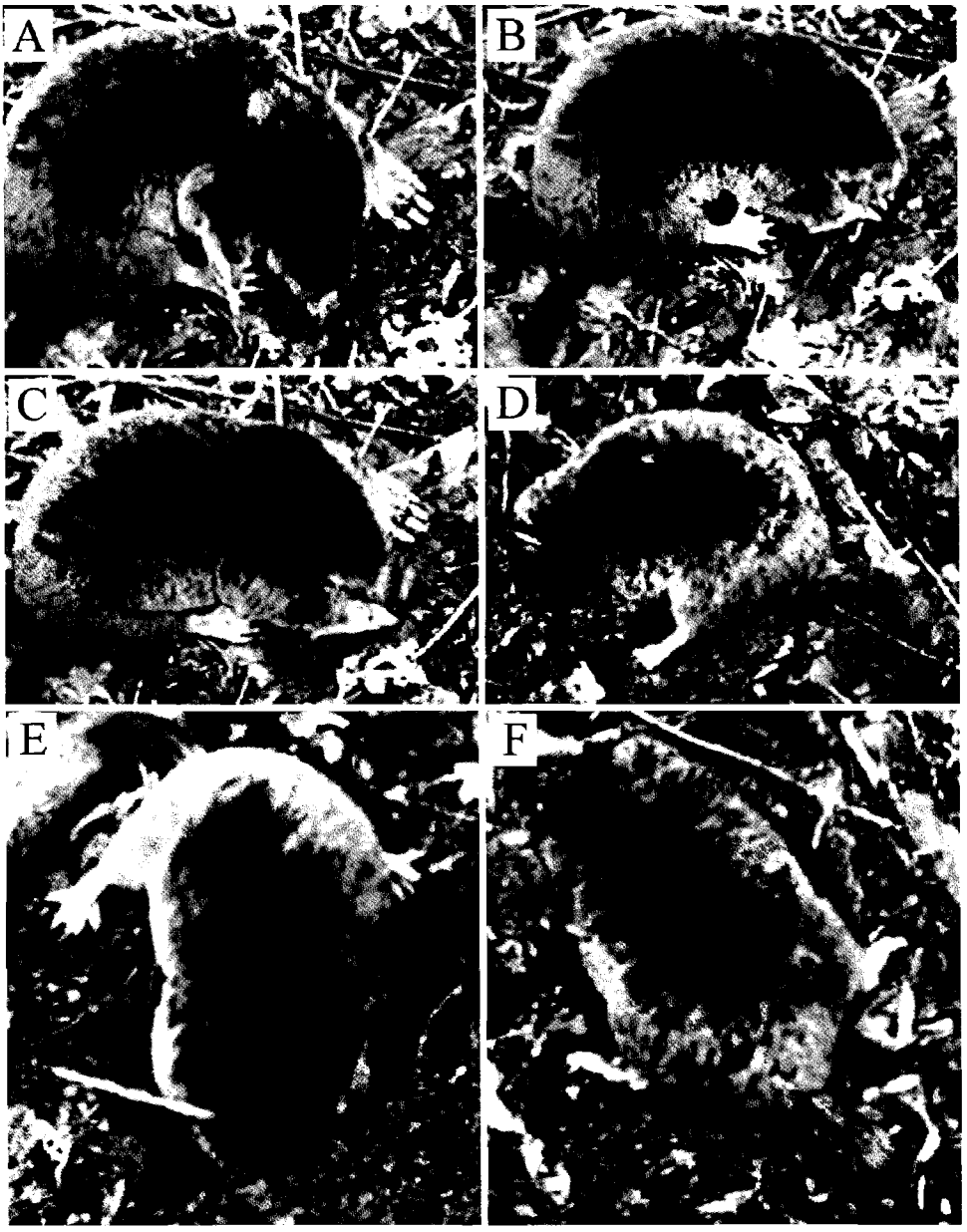

FIG. 1. Frames captured from VHS-videotape of hairy-tailed mole manipulating and consuming an earthworm (A–C) and digging for prey (D–F) on the floodplain of Santeetlah Creek, Graham County, North Carolina.

surface when I first noticed it. It favored a sparse patch of grass and sedge in the clearing where it plowed vigorously through surficial deposits of humus and detritus leaving a disturbance trail in its wake. The mole periodically dug conical pits (2–6 cm deep), twisting from side to side using its rear feet for leverage and digging downward until only the hindquarters were visible (Fig. 1). When mats

of leaf litter were encountered, the mole burrowed underneath, powerfully shoving aside sticks and loose stones (as large as 370 g). Upon reaching the edge of a litter or humus deposit, the mole moved with surprising rapidity across bare patches of packed earth (up to 4 m wide) to the next deposit. It worked slowly in one instance through a thick deposit of coarse decomposing sawdust. Twice at dusk, the mole was videotaped under the indirect beam of a flashlight at a distance of 0.5 m without evoking a visible reaction in its behavior. I suspected that vibrations and intense low-frequency noise from the cascading creek (25 m away) masked my movements.

Earthworms (Lumbricidae: *Lumbricus rubellus* Hoffmeister: *Aporrectodea caliginosa* Savigny) periodically emerged from the detritus a few centimeters in front of the foraging mole and rapidly crawled away across the surface of the ground. Twice, the mole briskly followed a worm for ~0.5 m but quickly back-tracked to the diggings. None of the dozen or so earthworms observed crawling away were captured. However, the mole frequently captured worms and other unidentified prey items, which were held down with the mole's forefeet, in surficial diggings. The mole briefly touched its snout to land snails, but showed little interest in them as food items.

The longest foraging excursion lasted a minimum of 38 min (20:05–20:43), when the mole covered 27 m on the surface (18 m in linear extent) and 6 m in shallow sub-surface burrows. The mole concluded three foraging excursions by entering a semi-concealed burrow entrance at the base of a large black birch (*Betula lenta*) and two other times disappeared into deeper tunnels within the foraging territory.

In conclusion, the sighting of *Parascalops breweri* at Big Santeetlah Creek represents a westward range extension of approximately 70–75 km from previous records near Highlands, Macon County, North Carolina (Gordon and Bailey, 1963), and Mountain City, Rabun County, Georgia (Learm, 1992; Brown, 1993), and the first record west of the Little Tennessee River in the southern Appalachian Mountains. Surficial diggings observed at several other locations on the Big Santeetlah Creek floodplain (720–750 m above sea level) suggest that hairy-tailed moles may be locally common in extreme western North Carolina.

Acknowledgments: I thank Sam James for identifying the earthworms, John Gerwin for providing specimen data from the North Carolina Museum of Natural History, and Barbara Blake and Neil Woodman for reviewing the manuscript. Field work was supported by the Alexander Wetmore Fund of the Smithsonian Institution.

LITERATURE CITED

BROWN, L. N. 1993. Presence of the southern bog lemming (*Synaptomys cooperi*) and hairy-tailed mole (*Parascalops breweri*) in Georgia. Georgia J. Sci. 51:112.

EADIE, W. R. 1939. A contribution to the biology of *Parascalops breweri*. J. Mamm. 20:150–173.

GORDON, R. E., AND J. R. BAILEY. 1963. The occurrence of *Parascalops breweri* on the Highlands (North Carolina) Plateau. J. Mamm. 44:580–581.

HALLETT, J. G. 1978. *Parascalops breweri*. Mamm. Species 98:1–4.

HAMILTON, W. J., JR. 1939. Activity of Brewer's Mole (*Parascalops breweri*). J. Mamm. 20:307–310.

JENSEN, I. M. 1986a. Foraging strategies of the mole (*Parascalops breweri*, Bachman, 1842). I. The distribution of prey. Can. J. Zool. 64:1727–1733.

———. 1986b. Foraging strategies of the mole (*Parascalops breweri*, Bachman, 1842). II. The economics of finding prey. Can. J. Zool. 64:1734–1738.

LEARM, J. 1992. Georgia's rarest mammal. Georgia Wildlife 2:46–53.

Received 1 April 2002