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NOCTURNAL ACTIVITY PATTERNS OF FERAL PONIES

In the last decade a number of field studies have investigated the behavior of feral mustangs (Feist, 1971), ponies (Tyler, 1972), and burros (Moehlman, 1974), and considerable insight has been gained concerning daily and seasonal activity patterns. However, these studies describe behavior during the daylight hours, and almost no quantitative data exist on the natural nocturnal behavior of equines. Blakeslee (1974) observed free-ranging Appaloosa horses at night, but did not quantify her data. The lack of knowledge results from a variety of factors including the lack of tolerance on the part of the animals to the nocturnal presence of man, the size and topography of the study area, and the lack of proper equipment for carrying out observations at night. Knowledge of the nocturnal behavior of feral equids is important for calculating the home range and daily movements, and for determining forage consumption and daily food and water intake.

In the present study, observations were made on the nocturnal behavior of feral ponies on Assateague Island, a 37-mile-long barrier island that parallels the Atlantic coast of Maryland and Virginia. The primary objective was to determine the activity patterns displayed by the ponies during the hours of darkness. The animals were habituated to the presence of man and could be observed, using lanterns and a night vision scope, from short distances without affecting the normal behavior. The topography of Assateague Island also facilitated observation, because the land is flat and consists primarily of saltmarsh.

Approximately 150 ponies occupy Assateague Island and lead a relatively wild existence in that they roam freely and obtain their own food throughout the year. The ponies are organized into approximately 20 herds. Individuals could be recognized on the basis of sex, size, color, and markings, and each was assigned a code letter, indicating herd membership, and a code number. Observations were conducted from 1900 to 0500 h EST on 14 evenings during the summers of 1976 and 1977 (four evenings in June, six evenings in July, and four evenings in August) for a total of 130 h of direct field observation. During each observation period, the behavior of ponies in a particular herd was monitored using a Starlight Image Intensifier Scope. Battery powered lanterns were also used to check behavior and did not appear to disturb the animals as long as illumination was limited to periods of about 10 sec. Data were collected on the behavior of individual animals and on the entire herd and recorded on check sheets where various activities were scored at 1-min intervals for each hour of darkness. For a behavior to be recorded on the data sheet, that activity had to occur for at least 30 out of the 60 sec in that interval. Using the categories established by Berger (1977), the six different kinds of general activities scored were: 1) Feeding Patterns ("Grazing")—walking in search of food as well as ingestive behavior; 2) Resting Patterns—relatively motionless behavior that includes "Standing," and "Lying Down," including both lateral or sternal recumbency; 3) Walking Patterns ("Walking")—locomotor movements to or from an area, usually in single file and along trails; 4) Drinking Patterns—activities associated with the consumption of water; 5) Auto-Grooming Patterns—activities associated with care of the coat and include "Rubbing" against trees or bushes and "Rolling" of the entire body in the grass or sand; 6) Mutual Grooming Patterns—simultaneous reciprocal grooming on the part of two or more animals that are important in maintaining social organization. Other behaviors such as urination, defecation, and sexual activity were of short duration and were not recorded.

The mean duration for each activity for each hour was calculated using data from the total number of individuals observed during that hour. These values were then tested against data from each of the other hours by using a one-way analysis of variance.

TABLE 1.—Nocturnal behavior of feral ponies. Frequencies expressed are the mean of the total observations for each hour. Statistical analysis used one-way analysis of variance. Significant differences between hours are indicated by an asterisk ($P < 0.01$).

Hours (EST)	N	Frequency of behaviors (min)						
		Graze	Stand	Down	Walk	Rub/Roll	Drink	Mutual groom
1900–2000	157	41.10*	7.60	1.70	8.44*	0.41	0.23	0.52*
2000–2100	181	38.46*	12.10	3.20	5.15	0.25	0.19	0.65*
2100–2200	163	35.40*	14.40	6.10	3.43	0.12	0.18	0.37*
2200–2300	166	31.74	19.90*	6.70	1.21	0.19	0.00	0.26*
2300–2400	149	32.20	17.20*	9.40*	1.03	0.09	0.04	0.04
0000–0100	156	31.80	15.08	11.90*	0.93	0.25	0.00	0.04
0100–0200	116	25.60	14.70	18.70*	0.50	0.47	0.00	0.03
0200–0300	128	25.40	12.40	19.80*	1.94	0.41	0.02	0.03
0300–0400	115	24.00	16.30*	17.60*	1.68	0.40	0.00	0.02
0400–0500	103	42.00*	10.90	4.30	2.27	0.25	0.00	0.28*
Means		32.78	14.07	9.89	2.67	0.29	0.07	0.23

The Assateague ponies spent more than one half (54.6%) of the 10 h between 1900–0500 EST engaged in grazing behavior. They spent about 40% of the time engaged in resting behaviors.

Table 1 shows that the animals tended to have a definite activity pattern over the course of a night. Following the onset of darkness the ponies tended to move to water; on eight of 14 evenings, the herds moved to water within the first hour of darkness—Table 1 illustrates that walking behavior was significantly higher in the first hour after dark ($P < 0.01$). Likewise, the highest incidence of drinking behavior was recorded in the first hour after darkness, although such behavior was observed during 5 hours over the course of the night. Movement to water just before and following sunset (1900 h) also has been noted in zebras (Joubert, 1972), although those observations were terminated at 2000 h. On the other hand, Blakeslee (1974) reported that free-ranging Appaloosa horses were never observed drinking at night.

Although grazing behavior occurred in every hour of darkness, some primary grazing periods were evident (Table 1). One period began at sunset and continued until about 2200 h. Another period began about 0400 h and continued until after sunrise.

As a night progressed, grazing activity decreased and resting behaviors increased. This transition often involved movement, while grazing, from feeding areas in the marsh to resting sites located on "islands" of elevated sand supporting stands of pine and oak (scattered throughout the marsh), on the primary dunes overlooking the ocean, or on the sand beach. Of the two resting behaviors, standing was most common, occupying 23.5% of the hours of darkness, and was observed most often from 2200 to 2400 h and from 0300 to 0400 h. Lying down occupied approximately 26.6% of the total study time, occurring infrequently in early evening and reaching a peak in the early morning (Table 1). A similar pattern was noted by Blakeslee (1974), who found that many of her horses lay down in lateral recumbency during the middle of the night (from about 0200 to 0300 h).

Despite the high frequency of lying-down behavior in the early morning (between 0100 and 0400 h), all ponies of a band were never seen lying down simultaneously. On the other hand, entire herds of free-ranging Appaloosa horses have been seen recumbent at one time during the day (Stebbins, 1974).

Grooming behaviors (rubbing and rolling) occurred at relatively low frequencies throughout the night and the levels were not significantly different with respect to time. Mutual (reciprocal) grooming behavior was significantly decreased between 2300 and 0400 h. This decrease probably resulted because resting behavior was highest at these times. Apparently, resting activity decreases the contact necessary for initiation of mutual grooming.

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OPPORTUNISTIC FEEDING BY TWO SPECIES OF *MYOTIS*

Although refuging species of insectivorous bats are generally assumed to practice opportunistic feeding, there are few recorded observations that support this assumption. In his discussion of the feeding biology of the cave myotis (*Myotis velifer*), Kunz (*Ecology*, 55:693-711, 1974) described a style of foraging in this species that might indicate opportunistic feeding. Using a black light to attract concentrations of insects, Fenton and Morris (*Canadian J. Zool.*, 54:526-530, 1976) demonstrated opportunistic foraging in *M. yumanensis*. The present report describes opportunistic and selective feeding by this species and *M. velifer* in response to a naturally occurring concentration of insects.

My observations were made at the base of a limestone and sandstone cliff that borders the eastern edge of the floodplain of the Verde River at an elevation of 945 m, 10 km SE Camp Verde, Yavapai Co., Arizona. The area is semi-desert. The floodplain supports mesquite (*Prosopis juliflora*), catclaw (*Acacia greggii*), seep-willow (*Baccharis glutinosa*), desert-willow (*Chilopsis linearis*), and scattered sycamore (*Plantanus wrightii*). Conspicuous plants on the adjacent slopes are juniper (*Juniperus* spp.), canotia (*Canotia holacantha*), and four-wing saltbush (*Atriplex canescens*).

From May until mid-August 1972, a maternity colony of at least 5,000 cave myotis occupied successively several of the caves in the cliffs. The bats typically began emerging about 15 min after sundown, and streams of dispersing bats swept down the river to the south, across the river to the west, up the river to the north, and lesser numbers followed the canyons to the east and dispersed over the mesas. Few bats remained within 1 km of the maternity roost. Although on most nights some bats began returning to the area before midnight, many remained away until early morning.

From April until early August, Yuma myotis roosted in narrow vertical crevices in the cliffs in groups of up to roughly 30 individuals, and single bats occasionally occupied small pockets in the cliffs. In August, after the cliff swallows (*Petrichelidon pyrrhonota*) that nested in great numbers on the cliffs had left, the Yuma myotis abandoned rock crevices and roosted in the mud nests of the swallows. These bats seemed not to disperse widely to forage, but fed locally over the floodplain and the river.

On the evening of 17 July, after a series of thunderstorms, large numbers of ants (*Pogonomyrmex* sp.) began flying from scattered sites in grassy areas above the cliffs. I began watching for bats at sunset at the base of these cliffs 0.5 km from the maternity roost of cave myotis. At this time considerable numbers of flying ants were coming from the top of the mesa some 10 m above; the ants concentrated on the lee side of the cliff where they were partially protected from the breeze. At about 2010 h a cave myotis flew rapidly past my vantage point, turned abruptly,