MOVEMENTS AND ACTIVITY PATTERNS OF FEMALE WHITE-TAILED DEER DURING RUT[1]

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Abstract: Ten female white-tailed deer (*Odocoileus virginianus*) were live-trapped, radio-tagged, released, and monitored for a 5-month period (Nov. 1975 - Mar. 1976) on the Fred T. Stimpson Wildlife Sanctuary in Clarke County Alabama. Study animals were monitored hourly during 74 individual diel periods before, during, and after the peak of rut. Additional random daily monitoring (2512 locations) was also conducted. Minimum home ranges did not differ statistically among the pre-rut, rut, and post-rut study periods. Minimum total linear distance moved during diel periods, distance between extreme diel locations, minimum diel area covered, and minimum portion of home range utilized during diel periods were significantly ($P < 0.05$) smaller during rut. Diel activity was significantly higher ($P < 0.01$) during rut than during pre-rut or post-rut. The general pattern of movement changed from relatively long linear movements during pre-rut and post-rut to repeated crisscrossing movements of shorter magnitude within restricted areas during the rut. The increased activity and decreased movement during the rut appeared to be associated with breeding.

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Numerous studies have been conducted on seasonal and daily movement and activity of white-tailed deer, yet few have been designed specifically to define changes in movement and activity associated with the rut.

Results obtained from 13 does studied under penned conditions in Michigan by Oaoga and Verme (1975) determined that the onset of estrus is characterized by predictable changes in activity levels. The authors stated that does may travel considerable distances during the period immediately before estrus but this was not documented in free-ranging white-tailed does.

This study was initiated in November 1975 to determine if changes in movements and activity patterns of unhunted female white-tailed deer occurred during the mating season.

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METHODS

Study Area

The study was conducted on the 2226 ha Fred T. Stimpson Sanctuary in southern Clarke County, Alabama, approximately 80 km north of Mobile. Topography consisted of steeply rolling, deep hollows alternating with ridges lying along the Tombigbee River. Elevation varied from approximately 5 to 109 m above sea level, with changes in elevation in some cases being abrupt. The area is dominated by mature timber stands. The sanctuary is afforded complete protection from hunting, and is not open to the public, thus the deer population has been much less influenced by human disturbance than most populations. White-tailed deer were extremely abundant during the study. In former years the population has been well above carrying capacity as evidenced by a distinct browse line in many localities. Most of the management effort on the sanctuary involves planting and maintaining approximately 61 winter and summer food plots which comprise 6% of the area and range from 0.1 to 0.6 ha in size.

Adult female white-tailed deer were captured in box-traps and radio-instrumented for telemetric study. In order to reduce handling time and minimize effects on the animals, no drugs were used to restrain the deer. Deer were held to the ground while radio-collars were attached therefore precise age and weight data could not be obtained. Two does instrumented in this study had been previously ear-tagged on the sanctuary. Doe No. 11 was ear-tagged as a fawn in 1966 and Doe No. 24 was ear-tagged as an adult in 1967. The remainder of does instrumented were judged to be adults based on physical characteristics. Transmitters were motion sensitive and operated in the 150.815 - 151.160 Mhz frequency range. Radio-collars were color-coded to ensure positive visual identification. Receiving equipment included a 24-channel Davidson receiver and a yagi 3-element hand-held antenna.

Locations of 10 radio-equipped does were determined by triangulation from 70 permanent receiving stations established at road intersections and field corners adjacent to 88 km of dirt and gravel roads on the study area. Activity was determined from variations in the physical characteristics of the radio signal itself. Through frequent observation of instrumented animals, variations in received audio signal frequency were related to different levels of the deer's activity. Based on these relationships, at each radio location the animal was recorded as being active or inactive. Since several directional readings were required to determine an animal's location, the activity level recorded for each location was actually determined from a number of audio contacts. Study animals were monitored hourly for location and activity during 74 individual diel periods before, during, and after the peak of rut. Additional random daily monitoring (2512 locations) was also conducted. The excellent road system on the sanctuary normally allowed the author to come within 180 m or less of the radioed deer when obtaining directional readings. This was possible because the majority of roads on the area was no more than 0.4 km apart. With the animal determined to be within an area bordered by particular roads, the maximum distance an animal could have been in a certain direction from a particular receiving station was known. Under these conditions, the accuracy of the telemetrically determined locations was adequate to provide detailed determination of movements during 24-hour tracking periods. Signal "bending" or "bounce" due to vegetation or terrain was minimized by taking readings from the highest point in the immediate vicinity.

Evaluation of movements and activity of study animals was divided into 3 periods (pre-rut, 6 Nov - 6 Jan; rut, 7 Jan - 29 Feb; post-rut, March) based on observations of white-tailed deer reproductive behavior on the sanctuary and supported by conception dates determined from pregnant does collected on the sanctuary by Leuth (1967) and observed matings of captive deer taken from the sanctuary (Haugen 1959). Directional readings of each instrumented individual were plotted on a reference map, the resulting locations grouped according to each period of the study. The radio-locations and related information (activity, date, time, etc.) were used in the development of certain movement and activity statistics for each deer during the pre-rut, rut, and post-rut periods. The following movement and activity variables were used as defined by Marchinton (1968) except that variables were calculated for each of the three periods separately:

1. *Minimum home range* — The area included within a line connecting the outermost radio locations of the deer during each period of telemetric and visual contact.

   The technique used to determine home range boundaries was similar to the modified minimum area method described by Harvey and Barbour (1965), but differed primarily in that knowledge of the habitat and the animals' movement patterns rather than a mechanical procedure was used in determining which points to connect.
2. *Minimum total distance moved in diel period (MTD)* — The sum of the distance between sequential locations of an individual deer during a particular 24-hour tracking period.
3. *Distance between extreme diel locations (DBE)* — The greatest distance between any 2 radio locations of the deer during a particular 24-hour tracking period.

In addition to the movement variables described by Marchinton (1968), the following movement and activity variables were developed during this study:

1. *Minimum bedding area* — The area included within a line connecting the outermost "inactive" radio locations of the deer during each period of the study.
2. *Minimum portion of home range utilized (MPU)* — The percent of a deer's home range utilized during a specific 24-hour tracking period.
3. *Minimum diel area* — The area included within a line connecting the outermost radio locations of the deer obtained during a specific 24-hour tracking period.
4. *Average distance between consecutive diel radio locations (DBC)* — The arithmetic mean of the distance moved between sequential radio locations during a 24-hour period. Radio locations were obtained at approximately hourly intervals.
5. *Diel activity index* — The percentage of total locations of a deer recorded as active during a specific 24-hour tracking period.
6. *Group circadian activity index* — 24-hour activity patterns expressed as percent active locations of 7 radio-instrumented deer recorded during each hour interval. Data were combined for all individuals to determine the group circadian activity index for pre-rut, rut, and post-rut periods separately.

Interaction checks were performed to determine if data of individual deer collected during diel periods could be combined within each study period for statistical analysis. An Analysis of Variance and Duncan's New Multiple Range Test were then employed to determine if differences existed between means of movement and activity variables measured for each study period.

RESULTS AND DISCUSSION

General Movement

Although variation in minimum home range occurred among periods for most individuals, the difference in minimum home range of deer during the 3 periods was not statistically significant ($P < 0.05$) (Table 1). The average minimum home range decreased progressively from 68 ha during the pre-rut period to 63 ha during the rut to 58 ha during the post-rut period.

Minimum bedding area was significantly smaller ($P < 0.05$) during rut than during pre-rut or post-rut, indicating that the radio-collared does restricted bedding activities to a smaller portion of their home ranges. During the rut the average minimum bedding area was 22 ha representing an average of 36% of each does minimum home range during that period. Pre-rut and post-rut minimum bedding areas were 28 ha and 26 ha respectively.

Diel Movement

Sanderson (1966) pointed out that although a great deal of attention has been paid to the size and shape of home ranges, they probably have little significance in themselves. A similar view was expressed by Sparrowe and Springer (1970) who believed that deer do not have an identifiable year-round range, but have ranges which consists of a variable number of sub-areas. This study was, however, in an area where available habitat was linearly distributed, a different situation than exists in Alabama. While home range and minimum bedding area data collected on the sanctuary suggested restricted movement by does during the rut, the data provided only limited knowledge of gross movement patterns during extended periods. The analysis of data obtained during specific diel periods provided a more precise determination of mating season effects on movement and activity.

The diel movement variables of each instrumented doe during pre-rut, rut, and post-rut are presented in Table 2. The minimum total distance (MTD) traveled during diel periods averaged 3.5 km during the rut. Rut MTD's were significantly shorter ($P < 0.05$) than pre-rut (4.3 km) and post-rut (4.0) MTD's. The MTD's of deer studied on the sanctuary were farther than the MTD's of 3.1 km and 2.43 km reported by Marchinton and Jeter (1967) and Byford (1970) respectively, for deer also studied in Alabama.

Although MTD's were typically in excess of 3.2 km during diel periods throughout the study, overall diel movement was generally within a relatively small portion of each doe's home range. The minimum portion of home range utilized (MPU) during diel periods averaged 16 to 37%. The average MPU decreased ($P < 0.05$) during the rut. Pre-rut, rut, and post-rut MPU's averaged 25%, 21%, and 29% respectively.

Table 1. Home range and minimum bedding area data of 9 radio-instrumented female white-tailed deer on Fred T. Stimpson Sanctuary, Clarke County, Alabama, 1975 - 76.

Deer Number	Study Period	Minimum Home Range (ha)	Minimum Bedding Area (ha)
08		80	27
09		66	26
10		42	08
11	Pre-Rut	61	39
12		82	35
16		63	19
24		84	14
Pre-Rut Mean ± SD		68 ± 15	28 ± 12
06		68	27
08		76	31
11		56	15
12	Rut	58	24
15		29	13
16		93	26
24		58	20
Rut Mean ± SD		63 ± 19	22 ± 06
06		39	19
08		82	38
11		41	21
12	Post-Rut	55	29
15		58	18
16		77	30
24		57	29
Post-Rut Mean ± SD		58 ± 16	26 ± 07
Overall Mean ± SD		63 ± 17	26 ± 08

Minimum diel area also decreased considerably ($P < 0.05$) during the rut. Diel area averaged 19 ha during pre-rut, 13 ha during rut, and 17 ha during post-rut. The deer also exhibited a tendency to shift areas of use from 1 diel period to the next. Deer seldom used the same immediate area during successive diel movement study periods. However, deer did use certain areas more often than others with preferred areas re-visited at least once every 2 to 3 weeks. Daily radio-locations indicated that the does spent several days in a relatively small area then shifted movement activity to an adjacent area, with preferred areas utilized more often and for longer periods.

The mean distance between extreme diel locations (DBE) was statistically shorter ($P < 0.05$) during rut than during pre-rut and post-rut. DBE's averaged 0.90 km during pre-rut, 0.71 km during rut, and 0.79 km during post-rut. During the rut, 58% of the DBE's calculated for all deer during specific diel movement studies were less than 0.72 km. During pre-rut only 13% of the DBE's were less

Table 2. Pre-rut, rut, and post-rut diel (24-hour) movement variables of 7 radio-instrumented white-tailed does on Fred T. Stimpson Sanctuary, Clarke County, Alabama, 1975 - 76.

Deer No.	Study Period	N[a]	MTD[b] (km)	DBE[b] (km)	MPU[b] (%)	MDA[b] (ha)	DBC[b] (km)
08		3	4.47	0.79	26	21	0.21
11		3	4.38	0.87	24	15	0.22
12	Pre-	4	3.59	0.80	28	18	0.19
16	Rut	1	4.58	0.80	28	18	0.19
24		4	4.65	0.70	27	22	0.24
Mean ± SD		15	4.28 ± 0.63	0.90 ± 0.17	25 ± 07	19 ± 06	0.21 ± 0.02
06		3	3.52	0.74	17	12	0.14
08		5	3.38	0.82	21	16	0.16
11		5	3.02	0.53	17	10	0.14
12	Rut	5	4.14	0.68	21	12	0.18
15		5	3.31	0.69	37	11	0.14
16		5	3.49	0.76	16	14	0.16
24		5	3.97	0.72	21	12	0.18
Mean ± SD		31	3.57 ± 0.58	0.71 ± 0.15	21 ± 08	13 ± 05	0.16 ± 0.02
06		4	3.75	0.55	24	09	0.16
08		4	4.78	0.95	36	32	0.21
11		4	3.22	0.72	26	11	0.14
12	Post-	4	3.96	0.71	27	14	0.18
15	Rut	4	3.86	0.84	30	17	0.19
16		4	3.80	0.84	24	19	0.19
24		4	4.44	0.87	34	19	0.21
Mean ± SD		28	3.97 ± 0.60	0.79 ± 0.16	29 ± 08	17 ± 08	0.18 ± 0.01
Mean ± SD	Overall	74	3.86 ± 0.45	0.77 ± 0.12	25 ± 05	16 ± 05	0.18 ± 0.01

[a] Number of diel movement studies used to determine each variable.
[b] See text for explanation of parameters.

than 0.72 km and 31% less than 0.72 km during post-rut. The overall mean DBE for the entire study was 0.77 km which is smaller than the mean DBE of 1.09 km reported by Marchinton and Jeter (1966).

The mean distance between consecutive diel radio locations (DBC) for each deer averaged 0.21 km during pre-rut, 0.16 km during rut, and 0.18 km during post-rut. The decrease in DBC during the rut was also statistically significant ($P < 0.05$). In addition, actual distance traveled between sequential locations was considerably farther than indicated by the DBC variable, since this is an average of the distance between all radio locations including inactive locations. During the pre-rut period, distance as far as 0.72 km between sequential locations were not uncommon. During the rut, however, movements less than 0.58 km between active locations were the rule even during periods of peak activity. Movements increased during the post-rut with distances up to 0.90 km traveled between sequential locations.

Cumulatively the diel movement data indicated a more restricted diel movement pattern during the period of rut. The general pattern of movement changed from relatively long linear movement during pre-rut and post-rut to repeated crossing movements of shorter magnitude within restricted areas during rut. This change in daily movement can be seen by comparing typical diel movement patterns during each period exhibited by Doe No. 24. During a pre-rut diel movement study on 22 - 23 December, Doe No. 24 traveled 4.65 km, encompassing 23 ha. Her DBE for this period was 1.6 km (Fig. 1). Approximately 41 days later on 3 - 4 February, her diel movement pattern was entirely different (Fig. 2). Although Doe No. 24 exhibited her highest diel activity index of 96% on this date, her MTD decreased to 3.86 km and her DBE was 0.61 km with total movement confined to an area of only 9 ha. This "zigzag" movement pattern occurred only during the rut and was always accompanied by an increase in activity. During the post-rut, Doe No. 24 returned to a pattern of diel movement similar to that of pre-rut. For example, on 25 - 26 March, Doe No. 24 moved a minimum total distance of 4.75 km and covered an area of approximately 18 ha (Fig. 3), which was twice the minimum diel area covered on 3 - 4 February during the rut. Similar changes in activity and movement patterns occurred during the rut for each instrumented doe. The reduction in movement also occurred during the period of lowest browse availability on the sanctuary when increased movements would be expected due to reduced seasonal habitat quality.

Marchinton (1968) telemetrically recorded the movement pattern of a radio-collared doe being pursued by a buck and found increased activity with only minimal movement. He assumed mating occurred.

For most deer, day locations were separated from night locations during any given diel period and the longest movement between consecutive locations normally occurred during the immediate hours of sunrise and sunset (Fig. 1, Fig. 3). However, during the rut, separation of day and night locations was not evident and linear crepuscular movement less pronounced (Fig. 2).

Diel Activity

One of the objectives of this study was to determine the activity patterns of instrumented does and define any changes resulting from reproductive activities.

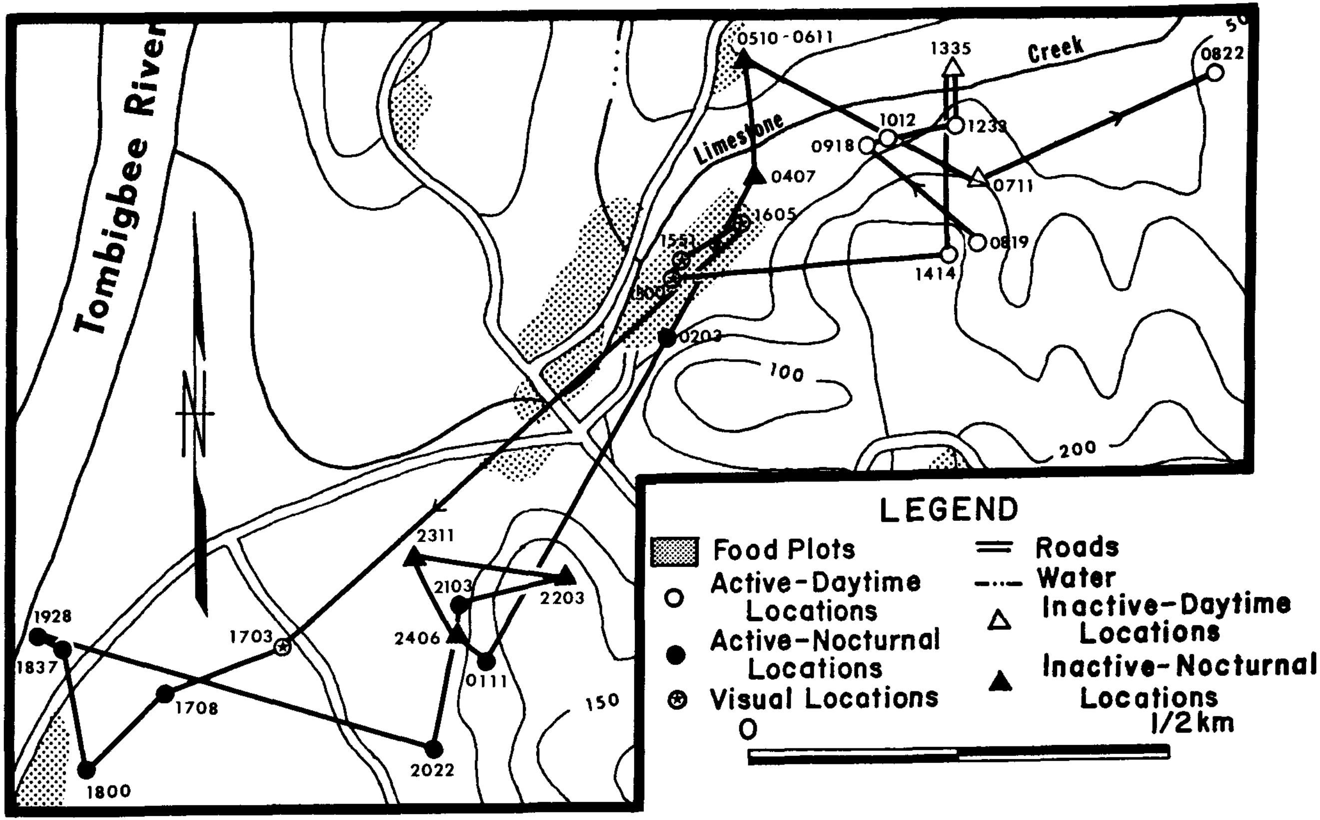

Fig. 1. The 24-hour movement pattern of radio-instrumented white-tailed Doe No. 24 on 22 - 23 December, 1975. Numerals are the times (based on the 24-hour clock) during which the animal was located.

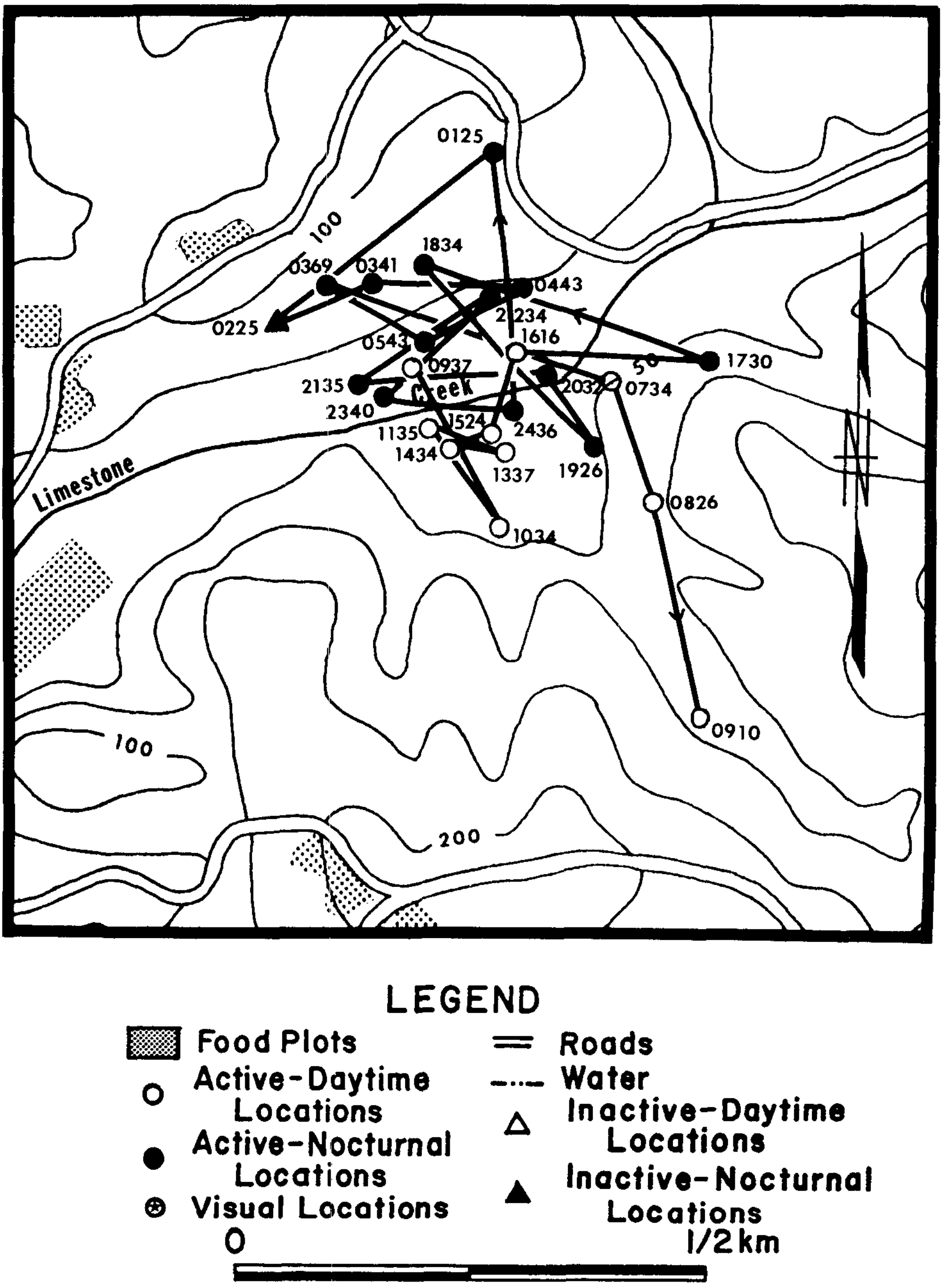

Fig. 2. The 24-hour movement pattern of radio-instrumented white-tailed Doe No. 24 on 3 - 4 February, 1976. Numerals are the times (based on the 24-hour clock) during which the animal was located.

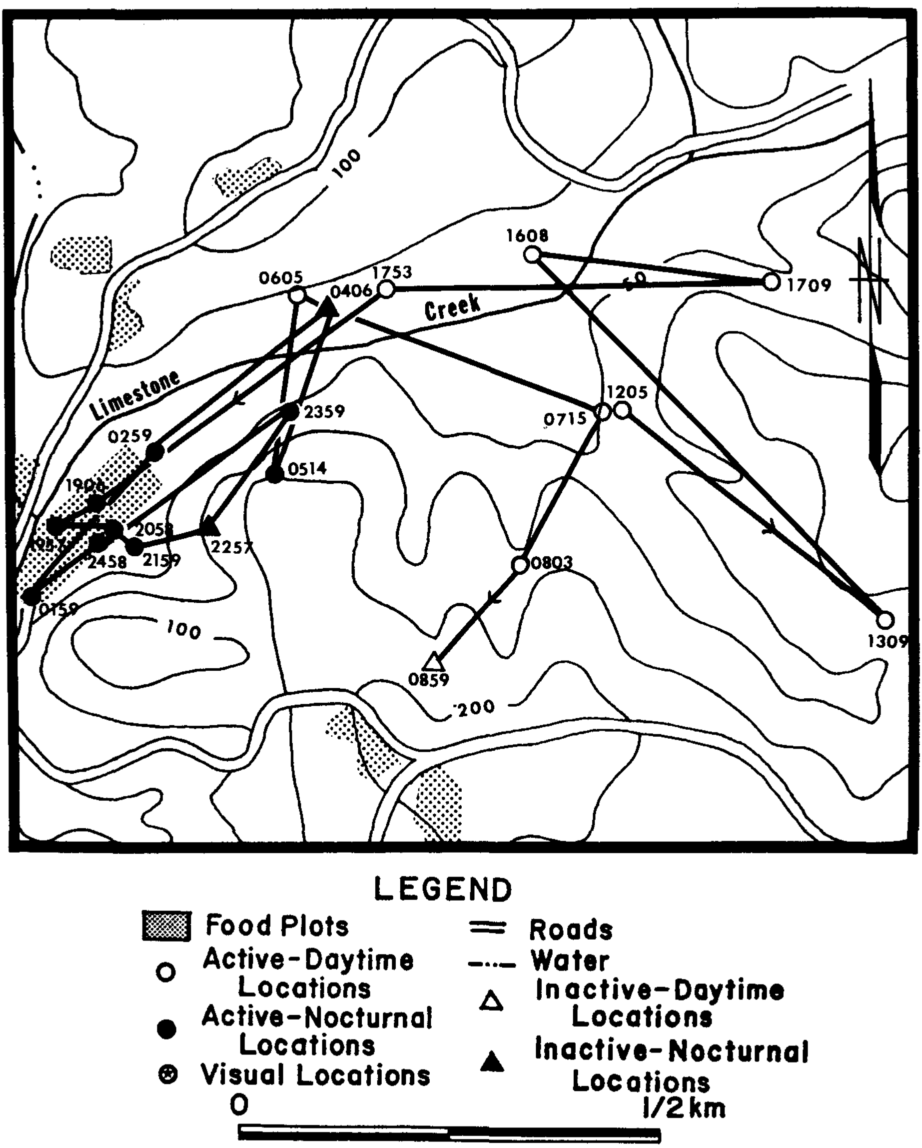

Fig. 3. The 24-hour pattern of radio-instrumented whitetailed Doe No. 24 on 25 - 26 March, 1976. Numerals are the times (based on the 24-hour clock) during which the animal was located.

Since white-tailed does normally are receptive for only a short period, there was concern whether it would be possible to define changes in activity resulting from breeding behavior on the basis of the 5 diel movement studies conducted on each animal during the rut compared to pre-rut and post-rut diel movements studies.

According to a number of researchers, it appears that male reproductive behavior could affect female activity at times other than the receptive period. Richardson and Petersen (1974) explained that bucks frequently pursue a doe tenaciously whether or not the doe is in heat. Severinghaus (1955) reported does may cause vigorous sexual stimulation in a buck for at least 2 days after mating, and an individual doe might attract a buck's continuous and ardent attention for a period of at least 5 to 6 days. Brown (1971) reported individual marked bucks following the same doe from 1 to 6 days. According to Hirth (1977) it appeared as though does were followed intermittently for several weeks before they reached the stage when presumably they were approaching estrus. Based on the preceding statements, it was assumed that the diel movement studies conducted on the sanctuary could coincide with periods of male influence on the activity of the instrumented females.

The mean diel activity index was significantly ($P < 0.01$) higher during rut than during the pre-rut or post-rut (Table 3). The instrumented does were active during an average of 56% of their pre-rut diel locations. The highest diel activity index recorded for an individual deer during the pre-rut was 67%, and the lowest 32%. Individual diel activity indexes during the rut ranged from 54% to 96%. For each radio-monitored doe, there was 1 or 2 diel periods during the rut when diel activity was considerably higher than was recorded any other time during the study. Although each individual exhibited some increase in activity during at least 3 of 5 diel movement studies conducted during the rut, activity normally peaked during 1 specific diel period. Peak activity for individuals occurred from 15 January to 10 February with no more than 2 individuals exhibiting peak activity during any 1 diel movement study period. Without exception, diel activity indexes during 4 of 5 rut diel movement studies of each doe exceeded their maximum diel activity index recorded during pre-rut. Six individuals had at least 1 diel activity index of 88% or more during the rut.

Four of the instrumented does were observed being actively pursued by bucks. In all 4 cases, the diel movement study conducted closest in time to each observed pursuit had the highest recorded activity of all the diel movement studies of that individual conducted during the study. Doe No. 24 had the highest diel activity index of 96% on 3 February, 5 days after she was observed being pursued by a buck. On 10 February, her diel activity index had dropped to 79%.

Following the cessation of breeding, a sharp decline in activity occurred. During the 1st 2 weeks of the post-rut period average diel activity decreased to 63%. A slight increase in activity occurred during the last 2 weeks in March. This increase in activity corresponded to the period of spring "green-up" on the sanctuary.

The period of highest activity based on telemetry data (Fig. 4) closely follows the period of peak buck-doe interactions determined through observations (Fig. 5). Collectively, telemetric and observational data indicated the gradual increase in doe activity during initial stages of the rut resulted from increased harassment of does by rutting males. Although the days during which diel movement studies were conducted probably did not correspond to each doe's period of estrus, the influence of their reproductive cycle was evident.

Table 3. Pre-rut, rut, and post-rut diel (24-hour) activity variables of 7 radio-instrumented white-tailed does on Fred T. Stimpson Sanctuary, Clarke County, Alabama, 1975 - 76.

Deer No.	Study Period	(N)[a]	Diel Activity Index (%)	Average Active Period (Hrs.)	Average Inactive Period (Hrs.)	Average No. of Periods
08	Pre-Rut	3	55.9	3.1	1.9	9.7
11		3	46.9	2.6	3.4	7.7
12		4	61.6	2.6	1.6	10.2
16		1	53.7	1.5	2.1	13.0
24		4	60.7	2.9	1.8	9.2
Pre-Rut Mean ± SD		15	56.1 ± 5.8	2.7 ± 0.6	2.2 ± 0.7	9.5 ± 1.7
06	Rut	3	78.3	5.2	1.7	6.7
08		5	73.9	4.9	1.8	6.0
11		5	71.2	6.4	2.5	5.4
12		5	67.2	3.3	1.8	9.6
15		5	80.0	5.8	1.7	6.0
16		5	71.5	5.3	3.1	5.4
24		5	85.0	6.9	2.5	6.9
Rut Mean ± SD		31	74.7 ± 6.1	5.4 ± 1.2	2.0 ± 0.2	6.4 ± 1.3
06	Post-Rut	4	62.9	5.1	1.7	10.5
08		4	65.9	3.6	2.0	8.5
11		4	74.3	5.0	1.5	7.5
12		4	58.6	2.6	1.8	11.5
15		4	78.4	8.9	1.3	6.0
16		4	69.4	3.7	1.7	8.0
24		4	75.3	4.0	1.4	8.8
Post-Rut Mean ± SD		(28)	69.3 ± 6.6	4.1 ± 2.0	1.6 ± 0.2	8.5 ± 1.7
Overall Mean ± SD		74	68.9 ± 6.5	4.1 ± 1.7	1.9 ± 0.5	7.8 ± 1.7

[a] Number of diel movement studies used to determine each variable.

Circadian rhythm, based on combined telemetric activity data for all the instrumented does, typically consisted of 2 major peaks of activity, occurring during early morning and late afternoons and from 1 to 3 minor peaks occurring during the night, varying with the study periods (Fig. 6). Similar findings have been reported by Ozoga and Verme (1970), Michael (1970), and Jackson et al. (1972). Most deer were relatively inactive during the 3 periods 0900 to 1400, 2100 to 2300, and 0100 to 0400 hours. Similar results have been reported by Kammermeyer and Marchinton (1977).

The primary change in circadian rhythm during the rut was an extension of the major activity peaks. During the pre-rut period, the 1st major activity peak occurred between 0700 and 0800 hours. The 2nd major peak began at approximately 1500 hours and lasted 3 hours. Three minor peaks occurred during the night every 3 to 4 hours, each lasting approximately 1 hour. During the rut, the morning peak began at 0600 hours and lasted 1 hour longer than the same activity period during pre-rut. The afternoon peak began 2 hours earlier during the rut and ended approximately 8 hours later at 1900 hours, representing an extension in activity of 5 hours over the same afternoon activity period during pre-rut. Post-rut circadian activity patterns were similar to pre-rut patterns except the morning peak occurred from 0600 to 0700 hours and the afternoon peak occurred from 1600 to 1900 hours, lasting only ½ as long as the same afternoon activity peak during the rut.

The changes in overall circadian activity of individual deer was the result of variation in the number and duration of alternating active and inactive periods occurring during each 24-hour period. Pre-rut diel periods normally consisted of 10 successive active and inactive periods for each deer (Table 3). Periods of activity averaged 2.7 hours, separated by periods of inactivity averaging 2.2 hours each. During rut, deer averaged 6.4 periods with active periods averaging 5.4 hours and inactive periods 2.0 hours. During post-rut, the number of active and inactive periods increased to an average of 8.5 per 24 hr period, with active periods lasting only 4.1 hours and inactive periods 1.6 hours. The duration of active periods of each deer during specific diel movement studies was significantly longer ($P < 0.01$) during the rut than during either the pre-rut or post-rut. There was no significant difference ($P < 0.01$) in duration of inactive periods between pre-rut, rut, and post-rut.

The increase in diel activity exhibited by each radio-tagged doe during the rut was considered to be primarily a result of a biological response to reproductive state. A correlation analysis revealed no significant relationship between activity and 3 temperature variables; maximum temperature, minimum temperature, and temperature range recorded during 24-hour periods.

During this study, does being ardently pursued by bucks were observed urinating frequently. According to Fraser (1968), frequent urination or "oestrual polyuria" is a fundamental behavioral character of estrus and one with a probable pheromonal function acting recriprocally on the male. Assuming that the rutting male uses primarily olfactory stimuli in locating an estrus female, it would appear biologically advantageous if the female's movements were such that maximum scent deposition was attained. Increased activity and repeated crossing movements within a restricted area could enhance the chances of scent-trail location by a male traveling through the area.

Telemetry studies of bucks on Fred T. Stimpson Sanctuary conducted during 1974 - 75 and 1975 - 76 (concurrent with this study) indicated that rutting adult

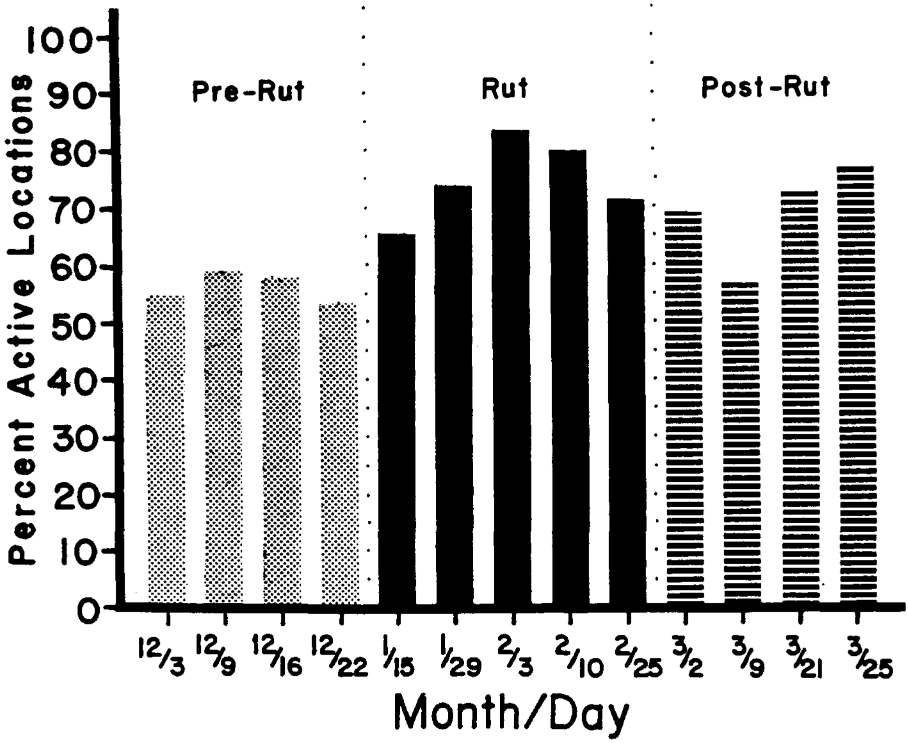

Fig. 4. Percent active locations during specific 24-hour movement studies of 7 radio-instrumented white-tailed does on Fred T. Stimpson Sanctuary, Clarke County, Alabama, 1975 - 76.

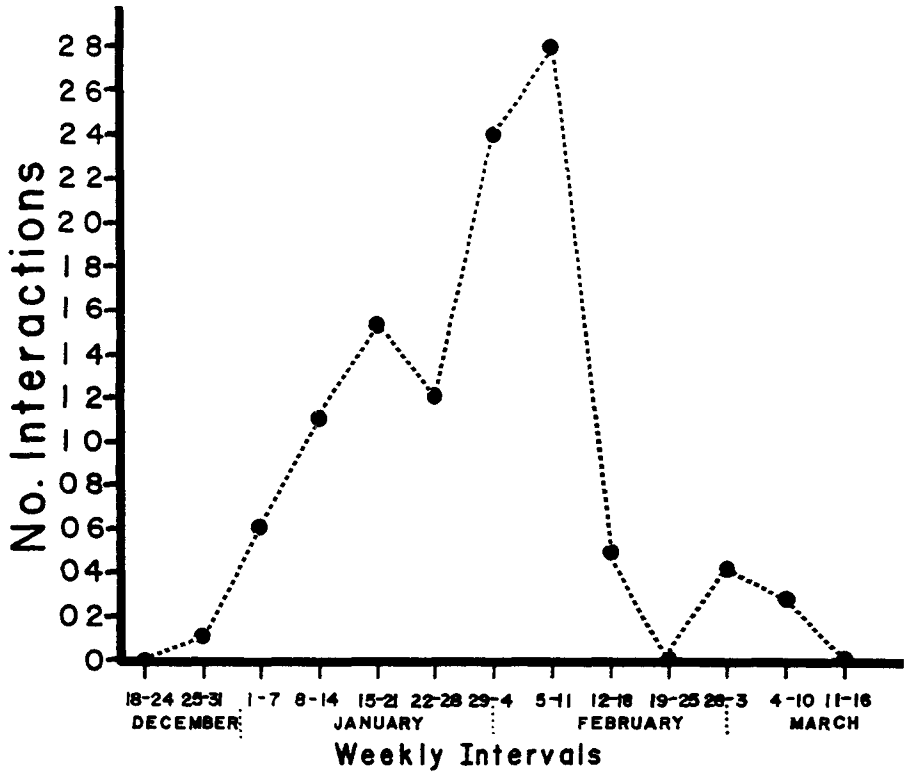

Fig. 5. Buck/Doe interactions observed on Fred T. Stimpson Sanctuary during weekly periods, December through March, 1975 - 76. An interaction included all the activities of breeding behavior from the time a male approached a female until the cessation of activity between them.

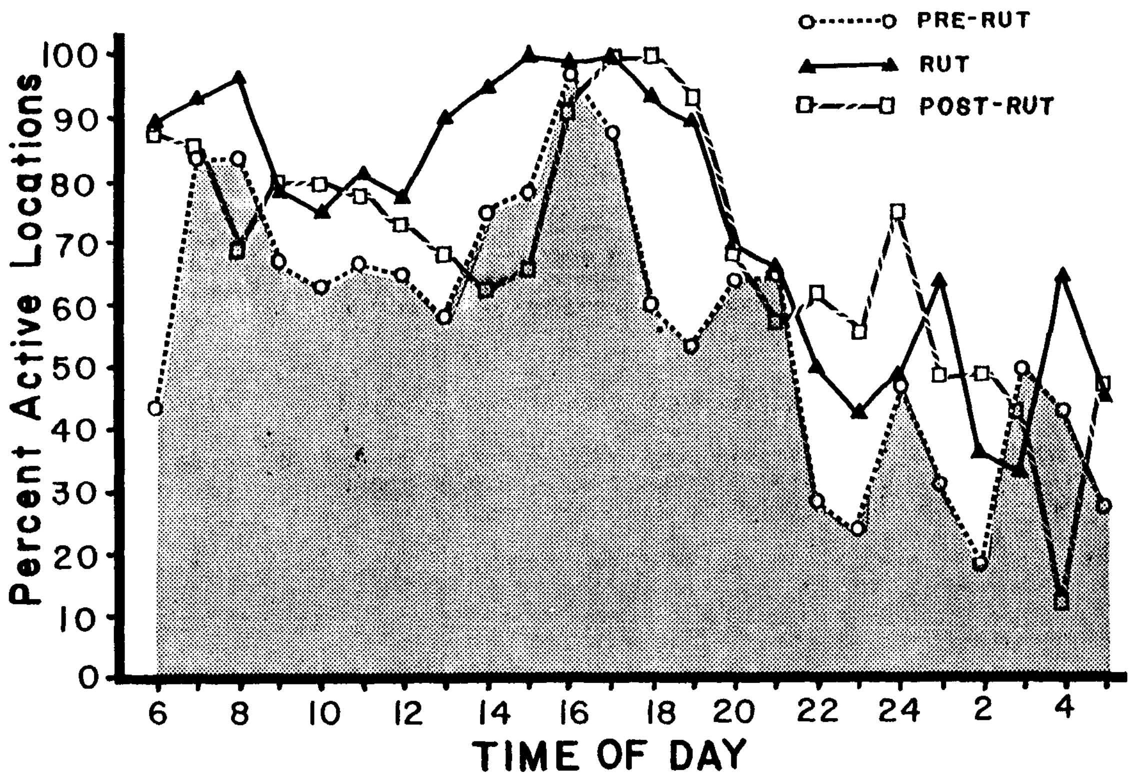

Fig. 6. Comparison of pre-rut, rut, and post-rut circadian activity patterns expressed as percent active locations recorded during each hour interval for 7 radio-instrumented white-tailed does on Fred T. Stimpson Sanctuary, Clarke County, Alabama, 1975 - 76.

males frequently move outside previously established home ranges during the rut, possibly in search of receptive does (Guyse 1978, Hosey 1980). The average home range of bucks during the rut was 172 ha (Hosey 1980). Pre-rut and post-rut minimum home ranges averaged 83 ha and 75 ha, respectively. The average MTD of males increased more than 1.6 km during the rut, and their diel area more than doubled during the same period when compared to pre-rut and post-rut. The concentrated movement and increased activity of does and the expanded movement of bucks would seem to provide optimum conditions for the location of receptive females by rutting males. If the female had also responded by increased mobility, scent deposition would have been less concentrated. Since a singular female may attract males several days prior to and after she reaches her period of receptiveness, high deer numbers and unbalanced male/female ratios could result in a number of females reaching receptiveness in the absence of rutting males. Large numbers of does nearing estrus in a given area could result in multiple crossing scent trails which could tend to confuse males following scent trails. By restricting movement, scent trails of different receptive does are less likely to overlap, enabling the males to locate particular estrus does.

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