SOME FACTORS INFLUENCING GOBBLING ACTIVITY AMONG WILD TURKEYS

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ABSTRACT

An investigation of factors influencing gobbling of adult and juvenile eastern wild turkeys (*Meleagris gallopavo silvestris*) was conducted in 1972 and 1973 in the Western Piedmont of South Carolina. General gobbling activity was monitored and individual gobbling behavior was studied. Five adult and seven juvenile gobblers were individually monitored on 24 mornings during the study in order to ascertain specific information on gobbling characteristics. Gobbling intensity of adult and juvenile gobblers was compared. Influences of weather on gobbling were evaluated. Data on changes in availability of hens and social structure of the gobbler population were discussed. The initiation and duration of gobbling was calculated for those gobblers regularly monitored.

INTRODUCTION

An investigation of variations in gobbling activity of adult and juvenile eastern wild turkey gobblers was conducted in the Western Piedmont section of South Carolina during the breeding seasons of 1972 and 1973. Factors influencing gobbling behavior of individuals were examined. This study was conducted in an attempt to identify mechanisms influencing spring gobbling activity. It has been observed that improving the skill of turkey hunters is essential in increasing harvests of spring gobblers. Providing factual information regarding the mechanisms controlling gobbling, in terms that the hunter can use to improve hunting techniques, should help increase hunter success.

Perhaps the most thorough investigation of wild turkey courtship behavior was conducted by Watts (1968) in his study of the social structure of various sibling groups and effects of peck order on breeding activities in the Rio Grande turkey (*M. g. intermedia*). Davis (unpublished data) studied the effects of weather on gobbling activity of the eastern wild turkey in Alabama. Barwick and Speake (1973) noted that one gobbler made over 100 calls between 05:30 and 10:00 hours. Increased day length and rising temperatures apparently trigger gobbling (Margolf et. al. 1947 and Burroughs and Kosin 1953). Davis (1971) stated..."each turkey gobbler is an individual and to date we have no way to predict how each individual will react on any given day".

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METHODS

The study area is located in McCormick County, 13 kilometers northwest of McCormick. This disected piedmont terrain is predominantly pin woodland, with mixed stands of upland pine-hardwood, and hardwood stream bottoms.

Several species in the red and white oak groups are unusually abundant in the overall forest complex. Pastures and fields comprise about 20 percent of the acreage. Clark Hill reservoir floods the Long Cane Creek bottom and effectively divides the study area. For purposes of this investigation, the majority of the data were collected in the central portion of the area, between the lake and S.C. 28 (Fig. 1).

Wild turkey gobblers and hens were captured from late February through mid-March with either orally administered tribromoethanol on cracked corn (Williams 1973) or with cannon and rocket nets (Austin 1965). I preferred to net once gobblers began to spend brief periods of the morning strutting, because they fed less and were often antagonistic toward hens and gobblers that were trying to feed at the bait site.

Adult turkeys were distinguished from juveniles (yearlings) by inspection of the greater upper secondary wing coverts (Williams and Austin 1970) and by other obvious characteristics. Gobblers captured as adults were simply called adults. All birds received numbered leg bands and were wing-tagged with individually identifiable streamers as described by Knowlton et. al. 1964.

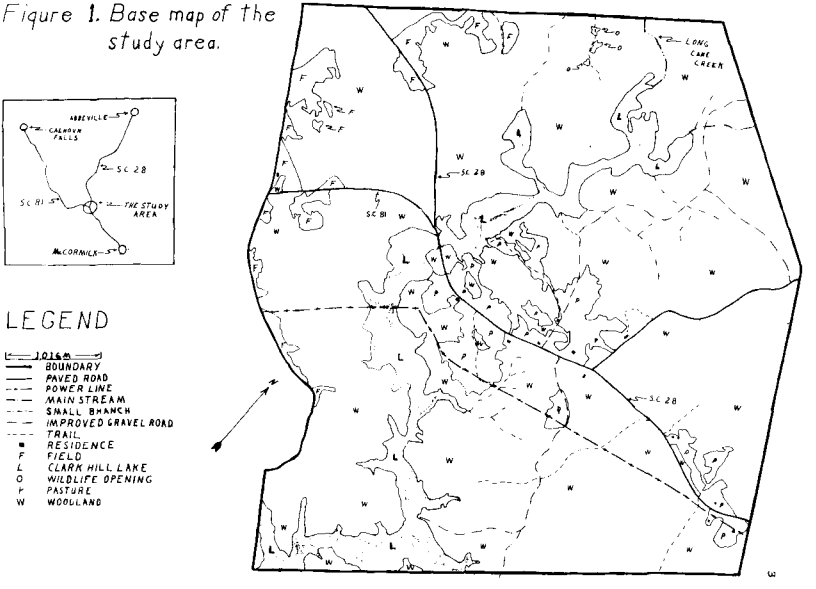

Figure 1. Base map of the study area.

Animal tracking transmitters operating in the 150 MHz range, emitting individually pulsed signals generated by one or two mercury batteries, with a total unit weight of 75 to 100 grams, were attached to each turkey in the manner described by Williams et. al. 1969. Portable receivers of a high sensitivity and hand-held directional antennas were used to locate each turkey.

Beginning on 15 March and continuing through 30 April 1972 and through 18 May 1973, gobbling activity was monitored every other day, beginning 30 minutes before official sunrise and continuing until 30 minutes after sunrise. The one hour period was divided into six 10-minute listening intervals (Fig. 2). Weather information was recorded prior to the start of monitoring (Davis, unpublished data). Gobblers selected for individual monitoring were located while on the roost either the evening before or well before sunrise on the monitoring

morning. When two or more gobblers roosted in close proximity and visual contact could not be made while they were in the woods, individual gobbling data were not recorded until separate identification could be established. Gobbling and other behavior were recorded on a data form devised for this study (Fig. 3). Individual gobbling activity was recorded on 24 mornings during the study. Five additional mornings were spent in close proximity to males that did not gobble.

Figure 2. Data form used for monitoring general gobbling activity beginning 30 minutes before sunrise and continuing until 30 minutes after sunrise.

Mo./Day/Yr.

Form No._____ Date_____ Station#_____

Clerk No._____ Sunrise _____

Temperature_____ Barometric Pressure_____
(inches & hundredths)

34 Cloud Contitions: Clear, Partly Cloudy, Cloudy (Circle one)

36 Fog Conditions: None, Light, Heavy

38 Precipitation in previous 24 hrs: None, Light, Moderate, Heavy

40 Present Precipitation: None, Light, Moderate, Heavy

42 Type of Present Precipitation: Rain, Snow, Sleet

44 Dew Factor: None, Light, Heavy, Precipitation

46 Frost Conditions: None, Light, Heavy

48 Wind Velocity: (Beaufort No.)

50 Wind Direction: North, South, East, West, Variable

Number of Gobblers and Gobbles/10 min. interval

	30 to 20	20 to 10	10 to 0	0 to 10	10 to 20	20 to 30
Gobblers	52-53	58-59	64-65	70-71	76-77	82-83
Gobbles	55-56	61-62	67-68	73-74	79-80	85-86

Figure 3. Data form used for recording individual gobbling activity.

TURKEY GOBBLING ACTIVITY DATA

Form #____Observer(s)_____, _____, _____ Date____/____/____.

Area _____ Sunrise _____Obs. Time Interval _____to_____.

Weather Conditions: Temperature_____

Cloud Cover: Clear Partly Cloudy Cloudy

Fog: None Light Heavy

Precipitation Type: Rain Hail Snow Sleet

Precipitation: None Light Moderate Heavy

Precipitation Previous 24 hrs.: None Light Moderate Heavy Sleet

Frost Conditions: None Light Heavy

Dew Factor: None Light Heavy Precipitation

Wind: 0 1 2 3 4 5 6 (Beaufort Scale)

ID	Time First Call	Time Flew Down	Gobbles/individual/10 minutes. 10	20	30	40	50	60	70	80	90	100	120	130

Individual Breeding Behavior: _____, _____, _____, _____.
Time Each Joined Hens: _____, _____, _____, _____.
No. of Hens in Harem: _____, _____, _____, _____.
Time Each Joined Gobblers: _____, _____, _____, _____.
Gobbling: _____, _____, _____, _____.
Strutting: _____, _____, _____, _____.
Drumming: _____, _____, _____, _____.
Mating: _____, _____, _____, _____.
Aggressiveness: _____, _____, _____, _____.
Roost Distance from nearest Active Gobbler: _____, _____, _____, _____.

Twelve hens were instrumented to facilitate study of the effects of nesting on gobbling and to attempt evaluation of the influence of hens on gobbling activity and behavior when in close proximity to gobblers.

RESULTS AND DISCUSSION

General gobbling activity on the study area is summarized in Table 1. Early peaks in gobbling activity occurred in both 1972 and 1973; however activity was more sporadic until mid-April, when it became fairly consistent through the end of the monitoring period. Fourteen of the 18 mornings of above-average gob-

bling activity occurred after 15 April, and in 1973 no morning during this later segment was without gobbling.

On 17 March 1972 telemetry fixes indicated that the mixed flock composed of two adult gobblers, 14 juvenile males and 12 hens, was beginning a rapid breakup. By the 19th the flock was widely scattered, but most were still within 700 meters of the station where gobbling activity was monitored every other day. On that morning at least six different gobblers (mostly juveniles) issued 215 calls (gobbles) during the monitoring hour. This was the peak calling day in 1972. It is believed that gobbling among juveniles sharply increased that morning because they were no longer under the suppressive influence of the two adults. The 12 hens were observed with both juvenile and adult gobblers in the initial period after flock breakup and dispersal. The two adult males remained near the capture site, but most of the juvenile males and hens left the vicinity and established ranges on the east side of S.C. 28.

During 1973 flocks were smaller, seldom numbering more than 10 birds and were more segregated by sex and age, which is most typical of late winter flocks prior to breakup (Ellis and Lewis 1967 and Bailey 1967) and unlike the mixed associations observed in the flock studied during 1972. Timing of flock breakup was not satisfactorily determined in 1973, although all events of the breeding season were noticeably later. Courtship displays observed as early as 20 February 1972 were not witnessed until about 10 March 1973. Most noticeable was the lack of intensity and duration of courtship until after mid-March 1973. Variation of flock breakup has been well documented and is attributed to the influence of spring weather conditions (Ellis and Lewis, 1967 and Barwick and Speake 1973).

Gobbling was above average on eighteen mornings during the study (Table 1) and on 20 mornings only two gobbles or less were recorded. Weather conditions during these good and very poor gobbling mornings are summarized on Tables 2 and 3. These data generally agree with Davis (1971), who found that weather factors may either singularly or in combination influence the amount of gobbling heard on a given morning. Dew factor (or the conditions that cause dew to form), cloud cover and wind velocity were determined to be important factors influencing gobbling.

Wind velocity and precipitation certainly limits human ability to hear gobbling. Data from this study were insufficient to be conclusive, but on five windy mornings I was very close to instrumented gobblers and was certain that they did not gobble. Overall data on these individual gobblers indicated them to be consistent callers, thus it appeared that the wind did inhibit their performance on these five days. Rain also seemed to inhibit overall gobbling. During a light rain on 23 March 1973 the clerk monitoring gobbling activity from the nearby station failed to hear a gobbler call from his roost 250 meters away. However, I was within 150 meters of the bird and heard him gobble three times. The monitoring days just before and after this rainy morning were clear, with light breezes and heavy dews; and on these days much more gobbling occurred (Table 1). At other times through the study I heard gobbling during light to moderate rains and also witnessed gobblers stop calling when rain started and resumed when rain ceased.

Gobblers were observed strutting and drumming in the presence of hens, without gobbling on rainy, windy, and/or cloudy days. However, strutting was less evident during rains, probably because strutting allows rain to penetrate to the skin causing discomfort. During rain gobblers would perform a semi-strut, with wings lowered and back feathers only slightly raised. The semi-strut was brief, usually lasting 10 to 20 seconds. The degree of stimulation resulting from the presence of a receptive hen seemed to be very important in dictating the amount of calling and displaying by a given individual during bad weather. Weather and its influences on gobbling is still under investigation in a more complex study scheduled for termination after the 1974 breeding season.

Table 1. Summary of gobbling activity on the study area during the 1972-73 spring breeding seasons, beginning on 15 March and ending on 30 April 1972 and 18 May 1973.

Date	No. Gobbles 1972	No. Gobblers* 1972	No. Gobbles 1973	No. Gobblers* 1973
3/15	6	1	41	2
3/17	1	1	0	0
3/19	215	6	1	1
3/21	46	5	2	2
3/23	1	1	28	2
3/25	6	2	0	0
3/27	28	1	82	3
3/29	18	2	0	0
3/31	0	0	0	0
4/2	0	0	31	2
4/4	0	0	2	1
4/6	0	0	34	3
4/8	70	2	1	1
4/10	35	1	0	0
4/12	0	0	0	0
4/14	0	0	2	1
4/16	0	0	59	2
4/18	98	5	224	4
4/20	33	1	8	2
4/22	116	3	80	2
4/24	199	4	9	1
4/26	96	4	21	2
4/28	48	2	68	3
4/30	15	3	6	2
5/2			75	3
5/4			11	2
5/6			58	3
5/8			21	2
5/10			278	3
5/12			37	2
5/14			12	1
5/16			50	4
5/18			61	4
Totals:	1031	44	1302	60
Ave./day:	43	2	39	2

Two Yr. Average: 41 Gobbles/2 Gobblers/day

*Number of gobblers based on the highest number of different males identified during one 10 minute listening interval. In some cases the number of gobblers shown in this table is a conservative estimate of the total number of the different gobblers heard.

Table 2. Summary of weather conditions, in percent occurrence, for 18 days of average or above average gobbling activity. Average gobbling based on data from Table 1.

	None	Light	Moderate*	Heavy
Fog Conditions	50%	45%		03%
Precipitation in Previous 24 hrs.	67%	22%	11%	00%
Present Precipitation	100%	00%	00%	00%
Dew Factor	03%	39%		56%
Frost Conditions	100%	00%		00%
Cloud Conditions	Clear-72%	Partly Cloudy-11%	Cloudy-17%	
Wind Velocity**:	B0=11% B1=44% B2=33% B3=11% B4=00% B5=00% B6=00%			
Wind Direction**:	North-27% South-00% East-45% West-27% Variable-00%			
Temperature:	Range-20° (40°-60°) Average-49°			

*A "moderate" classification was not used in assessing fog conditions, dew factor, or frost conditions because of subjectivity involved.
**Beaufort Scale or wind velocity was used.
***Wind direction data were collected during 1973.

Table 3. Summary of weather conditions for 20 days of far below average gobbling activity. Averages are based on 41 gobbles or more and at least two different gobblers calling during the spring breeding seasons of 1972-73.

	None	Light	Moderate*	Heavy	Precipitation
Fog Conditions:	80%	20%		00%	
Precipitation in Previous 24 hrs.:	60%	10%	10%	20%	
Present Precipitation:	70%	25%	5%	00%	
Dew Factor:	20%	35%		15%	30%
Frost Conditions:	85%	15%		00%	
Cloud Conditions:	Clear-50%	Partly Cloudy-10%	Cloudy-40%		
Wind Velocity**:	B0=00% B1=20% B2=40% B3=30% B4=10% B5=00% B6=5%				
Wind Direction***:	North-0% South-18% East-36% West-27% Variable-18%				
Temperature:	Range-32° (34°-66°) Average-48°				

*A "moderate" classification was not used in assessing fog conditions, dew factor, or frost conditions because of subjectivity in this judgment.
**Beaufort Scale of wind velocity was used.
***Wind direction data was only collected during 1973.

Early peaks in gobbling may best be described as resulting from intense competition between males seeking to establish dominance and attract hens. A second major peak occurs when the bulk of the hens have begun incubation and no longer visit the gobblers (Bailey and Rinell 1967). In 1972 the second major peak occurred during the last 12 days in April and only one hen was observed with the instrumented gobblers during this period. Although regular monitoring ended on 30 April, frequent early morning visits to the area indicated only sporadic gobbling continued into May.

In 1973, calling patterns were altered by unusual spring weather, characterized by frequent heavy rains during March, April, and May. Apparently a significant number of hens lost their first nests, as they visited gobblers throughout May. Because the return of hens to males was intermittent through this interval, the effect was an extended gobbling period, and prolific calling occurred well into June.

Dominance and establishment of peak order play important roles in governing gobbling on a given area. Although juvenile males gobble and occasionally service hens, older dominant males seldom provide them the opportunity (Watts 1968). In this study, individual gobblers were identified (Table 4) to facilitate evaluation of gobbling behavior and variations in gobbling between adults and juveniles. Of the nine different males studied, three were monitored during both years. The sample represents five adults and seven juveniles. While sample size was small, it should be recognized that the study was confined to the area within earshot of the station where general gobbling activity was monitored so that individual gobbling behavior data could be collected on the same group of birds.

Table 4. Summary of data on gobblers individually monitored for gobbling during the 1972-73 breeding seasons.

Year	Gobbler ID	Age	Gram Weight	Comments
1972	G-1	Adult (believe 2 yrs.)	8,164.8	Dominant male very aggressive.
	G-2	1 year	5,896.8	Dominant juvenile active gobbler.
	G-3	Adult (believe 2 yrs.)	7,711.2	Subdominant adult died in August 72.
	G-4	1 year	5,216.4	Always seen with G-5.
	G-5	1 year	6,237.0	Always seen with G-4 and is dominant of the two.
1973	G-1	Adult (believe 3 yrs.)	9,072.0	Remained dominant at start of breeding, however, G-2 took over in May.
	G-2	2 years	10,206.0	Became dominant male in early May.
	G-5	2 years	8,278.2	Was with G-4 when trapped, but missed G-4. Killed during hunting season.

Year	Gobbler ID	Age	Gram Weight	Comments
	G-6	1 year	5,216.4	Usually with G-7 or G-8.
	G-7	1 year	5,329.8	Shot during hunting season.
	G-8	1 year	4,536.0	Usually with G-6.
	G-9	1 year	5,216.4	Usually near G-1 and G-2, gobbled regularly.

When members of each age group could be monitored simultaneously the adult group gobbled five times as much as juveniles (Table 5). Ninety-two percent of the adults and 69 percent of the juveniles gobbled. During the average monitoring interval of 71 minutes the average adult gobbled 73 times, compared with 15 times by the average juvenile. On eight other mornings when only adult birds gobbled, the individual average was only 19 calls per 54 minutes. On all eight mornings the adults were either G-1 or G-2 or both. It appears that when one or more juveniles participate in calling the dominant adults respond more vigorously, challenging and suppressing the younger birds. This seems to be especially true of the dominant male and was often revealed by gobbling matches between adult G-2 and juvenile G-9. Once, G-2 gobbled 287 times between 04:55 and 07:35, and in one 10-minute interval called 54 times. Each time G-9 would issue one or two calls, G-2 would respond with from five to 25 calls, seldom pausing more than a few seconds between gobbles. Male G-2 was consistently the most prolific caller on the area in 1973.

When unsuppressed by a more dominant male, a juvenile may gobble much more. Juvenile G-6 responded to a calling device by gobbling 48 times in 40 minutes. Twenty-three gobbles were made by G-9 during a 10-minute interval and during G-2's juvenile year (1972) he made 18 gobbles in a 10-minute period, while in the presence of the dominant G-1. On a given day the dominant juvenile gobblers are capable of calling as much as any adult, but my data indicate that only a small percentage of the juveniles are consistent gobblers and they are probably the ones that move up quickly in the social order. Further, the tendency to be a prolific caller seems to become evident, at least in *silvestris*, during the first year. This is the likely result of a thinly dispersed breeding population and is in contrast to the breeding behavior of the Rio Grande turkey, which assembles in large groups during part of its breeding period (Watts, 1968).

In 1973, G-2 was without question the caller of the group, but G-1 was the dominant male through much of the breeding season. G-1 is at least one year older than G-2 and probably maintained his social rank from the previous year. Watts (1968) found that the two and three year age groups were dominant over older sibling groups because they usually outnumbered the older birds. During mid-May 1973 it appeared that G-2 became dominant over G-1, as he was observed chasing G-1 three times during this period and never before. Prior to this apparent shift, if G-2 was in a courtship behavior and G-1 came near him, G-2 would acknowledge G-1's rank by briefly discontinuing courtship or by moving away. During the two year period G-1 was not observed to be aggressive toward G-2, while he was aggressive toward other gobblers on numerous occasions. G-2 gobbled side by side with G-1 during late April of his juvenile year, but three other males, including G-3, G-4, and G-5, were suppressed by G-1. These males would gobble before joining G-1, but seldom in his presence. From these observations I concluded that the dominant male may develop a tolerance of certain individuals, even when they are not siblings.

Table 5. Comparison of gobbling of adult and juvenile wild turkey gobblers during the 1972-73 breeding seasons; when members of both age groups could be monitored simultaneously.

Date	No. Minutes Monitored	No. Adults Present	No. Adults Gobbling	Total Adult Gobbles	No. Juv. Present	No. Juv. Gobbling	Total Juv. Gobbles
4-24-71	60	2	2	142	3	3	57
4-26-72	50	2	1	32	3	1	18
4-28-72	50	1	1	26	3	1	19
4-18-73	60	2	2	216	2	2	6
4-28-73	60	2	2	61	1	1	4
5-12-73	60	2	2	241	1	1	37
5-16-73	60	2	2	45	2	2	5
5-18-73	50	2	2	49	2	2	15
5-30-73	60	1	1	22	2	0	0
5-31-73	70	1	1	113	1	1	6
6-2-73	150	2	2	315	1	1	38
6-3-73	75	1	1	108	1	1	33
6-4-73	70	2	1	46	1	1	6
6-5-73	80	1	1	51	2	0	0
6-7-73	80	1	1	163	1	1	21
Totals	1065	24	22	1632	26	18	265
$\bar{x}^t$ (x =71 min.)							
Percent Gobbling		92%				69%	
Ave. No. Gobbles/ Age Group/ 71 min.		109				18	
Ave. No. Males Gobbling/ Day		1.5				1.2	
Ave. No. Gobbles/ Individual		73				15	

$\bar{x}^t$ = Average number of minutes per monitoring day.

The only observed mating on the area was performed by G-1 in 1973, and is perhaps noteworthy because of the scarcity of recorded data on this behavior. On 3 April 1973, from 17:10 to 18:15 hours G-1, G-2, G-6, one unmarked yearling male, and four hens were feeding in a pasture. At 17:40 both G-1 and G-2 began strutting, G-1 in the rear of the group and G-2 leading the group as they slowly moved toward the woods. G-1 and G-2 maintained a separation of about 15 meters, with all other birds between them. Within minutes a hen moved in front of G-1 and crouched, however juvenile G-6 moved between them and attempted to mount the hen, which quickly arose and moved away. The hen crouched in front of G-1 repeatedly for about 15 minutes and each time the juvenile would harass her, causing her to move up a few steps then crouch again. All the while G-1 continued strutting, and it was G-2 that stopped strutting and chased the juvenile away from the hen, but did not attempt to mount her. After five minutes the hen crouched again and the juvenile attempted to move in, but G-1 began to circle her position and G-6 moved away. After circling about 10 times G-1 mounted the hen. G-2 then moved up and began circling the mating pair, as he strutted, For more than two minutes G-1 treaded the hen's back before crouching to complete copulation. Two minutes and 55 seconds elapsed during the act and as quickly as G-1 dismounted he resumed strutting and G-2 moved away. I have witnessed only one other mating; it lasted about 45 seconds.

Duration of breeding readiness must vary among individuals and between different age groups (Watt 1968). It seemed logical to me that individual breeding readiness was of rather short duration and that birds heard gobbling late in the season were probably not the same ones gobbling at the onset of mating. Table 6 indicates the duration of the gobbling period for some of the individuals monitored during this investigation. The unusual weather during 1973 must have prolonged gobbling activity, however it was surprising that G-2 was among the first and last birds heard during this unusual year. Most juvenile males were too sporadic in their calling for accurate determination of gobbling intervals.

CONCLUSIONS

Because no other studies of this nature were known to the author at the time of the investigation, evaluation of some segments of the data were difficult. It is evident that adults, on the average, gobble much more consistently than juveniles, but there is individual variation and the trait to become a prolific caller usually asserts itself during the gobbler's first spring. Weather conditions greatly influence gobbling, but some influences are not yet well understood. Many mechanisms, involved in an interrelated manner, influence gobbling. Much additional study is needed to properly evaluate controlling mechanisms.

Table 6. Approximate duration of the gobbling interval for three gobblers monitored during the 1972-73, breeding seasons.

Year	Identity of Male	Date First Age	Date Last Heard	Interval Heard	in Weeks
1972	G-1	Ad.	1 March	30 April	8
	G-2	Juv.	7 March	30 April	7
	G-3	Ad.	2 March	30 April	8
1973	G-1	Ad.	15 March	2 June	10½
	G-2	Ad.	15 March	10 July*	16

*G-2 was observed gobbling in early July by an assistant on the study area and the date given is approximate.

South Carolina turkey hunters mainly hunt the first three hours of daylight. During the two springs this investigation was being conducted, hunters in the Western Piedmont harvested 195 gobblers. Some 54 percent of these birds were bagged between daylight and 08:00. As stated previously, improving harvests of spring gobblers is related to improving the skill of the hunter. Results of this investigation may help many turkey enthusiast better understand the gobbler in springtime.

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