PERCENTAGE OF BREEDER SQUIRREL KILLED DURING THE 1949 SEASON AND ITS EFFECT UPON SETTING THE 1950-51 SEASON

AL MARSH, Chief, Game Management Section, State Game and Fish Commission, Nashville, Tennessee

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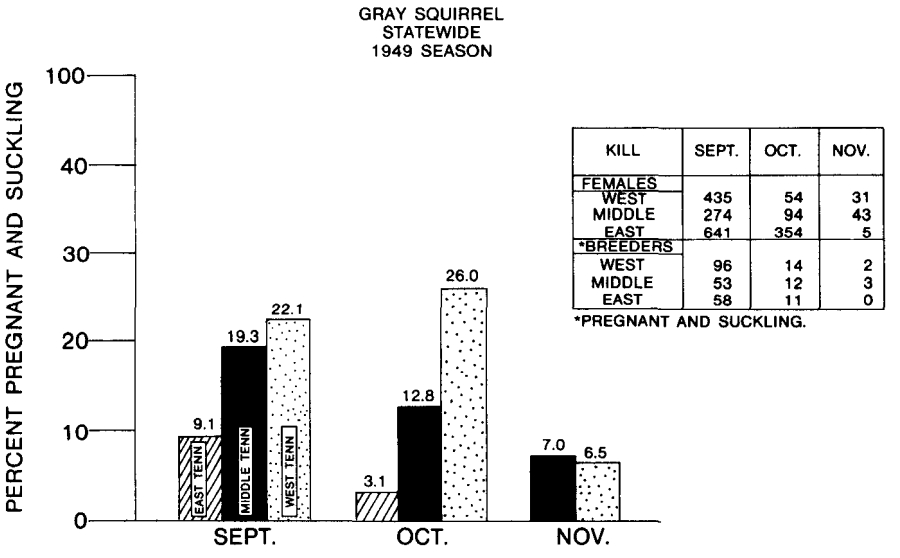
Tennessee, like most of the southeastern states, for years has been confronted with a difficult and perplexing squirrel management problem. Only during the past few years attention has been directed to projects primarily designed to accumulate factual data and information for a sound basis upon which satisfactory seasons and bag limits may be established with emphasis being placed on the welfare of the squirrel.

The gray squirrel *(Sciurus carolinensis),* and to a lesser degree the fox squirrel *(Sciurus niger niger),* is Tennessee's number one small game species. It is fairly well distributed over the entire state and receives the attention of more hunters in all walks of life and age groups, from the youngster who can hardly tote a gun to the incapacited elder of seventy years and over, than any other game animal or bird. Hunting pressure on squirrel is teriffic. Gray squirrel are distributed in varied habitats, from city parks and back yards to the remote wilderness rendering them easily accessible to the hunter. For generations the spunky nutcracker has provided a delightful morsel to some folks whenever the appetite demanded and they are still taken for "medicinal" purposes practically through the year. The squirrel's ability for a "quick come-back," his migratory habit, his reproductive dependence upon nourishing and adequate winter foods, and excessive logging operations, are other contributing factors to our present dilemma.

More than any other state, Tennessee is confronted with a unique situation in that geographically it is composed of three distinctly different Grand Divisions — East, Middle, and West — which compare favorably only in size. Tennessee-Kentucky Lake, which was the Tennessee River before installation of the TVA impoundment at Gilbertsville, Kentucky, exists as a definite boundary between the West and Middle Grand Divisions. An imaginary irregular line formed by highway and county boundaries separates the Middle and East Grand Divisions. Nevertheless, in these Divisions there exists a marked variance of topography, climate, flora, fauna, soil fertility, land-use practices, and human temperament, all of which have a bearing on the squirrels productive potential and behavior.

Imagine the involved problem in attempting to apply identical state-wide squirrel management techniques that will adequately apply to all areas; e.g., in the Great Smoky Mountains of extreme East Tennessee, where elevations exceed 6,000 feet; in the Cumberland Mountains in eastern Middle Tennessee; and the river bottoms, swamps and lowlands of West Tennessee. Squirrel breeding behavior in the different Grand Divisions during various months is indicated in Figure 1. All of this, coupled with consideration due administration, law enforcement, and the sportsmen's varied desires, makes squirrel management in Tennessee our number one headache.



KILL	SEPT.	OCT.	NOV.
FEMALES			
WEST	435	54	31
MIDDLE	274	94	43
EAST	641	354	5
*BREEDERS			
WEST	96	14	2
MIDDLE	53	12	3
EAST	58	11	0

*PREGNANT AND SUCKLING.

Fig. 1. Percentage of gray squirrel breeders of the total adult females killed during September, October and November, 1949, season in east, middle and west Tennessee.

Abolition of the June squirrel season in Tennessee in 1942 eliminated, probably forever, a hunting regulation which long had been branded vicious and incompatible with good squirrel conservation.

In 1942, the legal squirrel hunting season was set for August 1, a date which was viewed by many biologists as the lesser of two evils, because it was believed that during the month of August, as in June, many breeder and potential breeder squirrel were killed. In an attempt to alleviate this condition and to restore some semblance of good squirrel hunting for an every-increasing army of gunners, the squirrel season in 1947 opened on September 1 and closed December 31.

Although this was a gradual and unprecendented change, it was not accepted wholeheartedly by most squirrel hunting enthusiasts. They felt that the most desirable opportunity for participating in their favorite sport was unduly curtailed.

In the minds of game administrators and biologists, who must perpetuate game resources and, at the same time, provide a reasonable amount of sport during a period of reduced production potential and increased demand, the advisability of permitting squirrels to be hunted and killed as early as September 1 was questioned.

Data from neighboring states demonstrated, without doubt, that too many squirrels in breeding and suckling condition and in the process of raising their young were killed during the months of August and September. It was believed that to permit the existence of such a destructive practice in Tennessee, assuming conditions were similar to those in adjoining states, would be a gross lack of duty by those in charge of and responsible for the welfare of both squirrel and hunter.

Common sense would dictate that it is biologically unsound to take squirrel when they are breeding and suckling young, particularly during peak periods. Previous to this study, only fragmentary data had been accumulated in Tennessee to support the theory that too many squirrels in breeding condition were being killed during open seasons in September and October.

The primary objectives of this study were to determine the percentage of pregnant and suckling squirrels killed in relation to the total number of adult females taken and the total squirrel kill. The findings were to be used as a basis for setting the 1950 - 51 open squirrel hunting season.

METHOD AND MATERIALS

During the 1949 open squirrel season, September 1 to December 31, an investigation was conducted with the help of some 100 Conservation Officers who were previously instructed and trained for the job they performed.

In addition, information as to the number of adult males, non-breeding females, and young of various ages of both gray and fox squirrel were recorded.

This study did not include many of the other important factors, such as, hunting pressure, percent of kill, migration, concentrations, food availability, and habitat requirements.

All of the squirrel kill data was accumulated by Conservation Officers on printed postal cards designed for the investigation. Only positive information secured from a check of squirrel in the hunter's bag, voluntarily submitted for inspection and examination, was recorded. In no instance were hunters permitted to submit data on these squirrel kill cards. Previous experience proved such data to be totally unreliable.

RESULTS

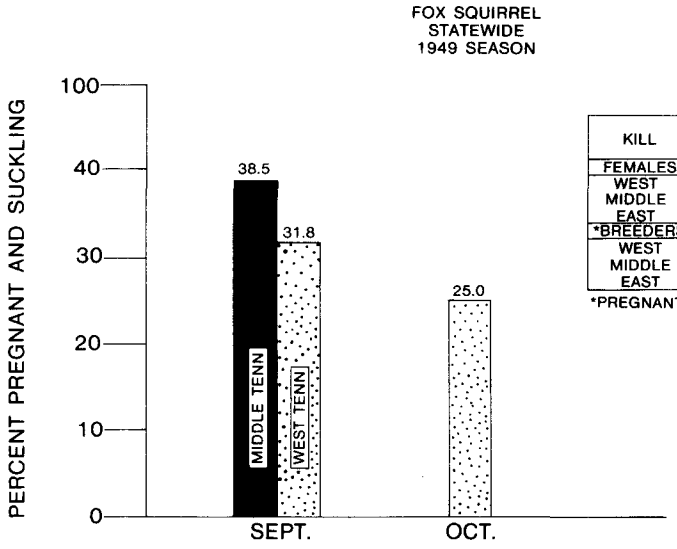
The season-long investigation produced a state-wide total of 6,172 samples of both gray and fox squirrel. A tabular breakdown showing the percentage of each condition by Grand Division to total kill is found in Table 1.

Table 1. Percentage of squirrel conditions to total kill.

Condition	Number Killed	Percent
Adult Males	2026	32.81%
Females carrying young (pregnant)	52	0.84
Females suckling young	235	3.81
Females, young already weaned	1088	17.63
Females, no indication of having had young	671	10.87
Young, ¼ grown	3	1.68
Young, ⅓ grown	86	1.39
Young, ½ grown	280	4.54
Young, ⅔ grown	603	9.77
Young, full grown	1029	16.67
TOTAL	6172	100.00%

Lactating females were recorded as being in the process of suckling young. Pregnancy was determined by actual observation of embryos. No attempt was made to determine the presence of oestrus in squirrel. Males that appeared to be full grown but with scrotum void of testes were recorded as full grown animals.

Data accumulated are presented for comparison in bar graph and tabular form (Fig. 1, 2, and 3) for the three Grand Divisions. The figures show only the percentage of breeders (pregnant and suckling) killed of the adult female total. Both gray and fox squirrel are represented. Fig. 2 represents too few samples to be of value in itself, but since Fig. 3 is a compilation of data contained in Fig. 1 and 2, it is included in this report.



KILL	SEPT.	OCT.	NOV.
FEMALES	63	4	0
WEST	13	7	0
MIDDLE	0	0	0
EAST			
*BREEDERS	20	1	0
WEST	5	0	0
MIDDLE	0	0	0
EAST			

*PREGNANT AND SUCKLING.

Fig. 2. Percentage of fox squirrel breeders of the total adult females killed during September and October, 1949 season in middle and west Tennessee.

In Fig. 1, a definite stairstep in the percentage o breeders killed from East to West Tennessee is illustrated. This may have been due to an approximate two weeks difference in climatic conditions. It appears that the task of raising young during the fall peak period is completed first in East Tennessee and then gradually progresses westward. East Tennessee squirrel kill data for November were not available. "Undivided" gun pressure was heaviest during September and progressively lessened in October and November. This seems to indicate a decreasing squirrel population, adverse hunting conditions and less gun pressure due to open seasons on other game species.

The study also showed a drastic drop in the percentage of breeder females killed in November as compared with October. The percentage of breeders to the total number of adult females killed during 1949 was 16.24 percent in September, 7.36 percent in October, and 6.1 percent in November. Data are not available for December but little difference in the percentage of adult breeders killed in comparison with November is probable.

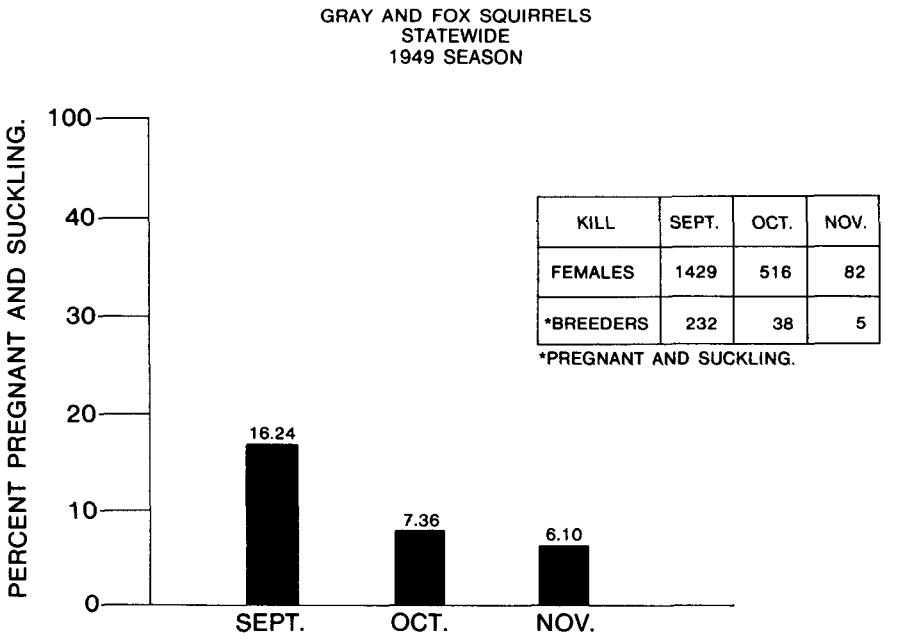


Fig. 3. Percentage of breeder gray and fox squirrels of the total adult females killed during September, October and November, 1949 season in east, middle and west Tennessee.

The preponderance of adult males in the total kill would indicate that females were occupied with family duties and the care of young; young less than one-half grown remained near their dens and/or nests.

Aside from accomplishing the primary objective of the squirrel-kill census, other important observations were made:

1. It was found that squirrels were extremely vulnerable to the shotgun during hickory nut and pecan cutting season. In Tennessee, the hickory nut and pecan cutting season usually begins about September 1.
2. During the early part of September, it was not uncommon to kill entire families consisting of parent females and from two to four young, ¼ to ⅓ grown.
3. Although young squirrel are preferred for food, a number of young too small for human consumption were killed early in September and discarded. It is virtually impossible for a hunter to select his shots from a standpoint of squirrel size when hunting in tall timber and under adverse light conditions.
4. During September, numerous reports came from the East Tennessee mountains of squirrels infected with warble fly larvae *(Cuterebra* sp.), commonly referred to as "wolves" by the sportsmen. In every known instance infected squirrels were thrown away.
5. The relatively large number of young bagged in various stages of growth would indicate a successful 1949 breeding and raising season.

In some respects, the squirrel hunting and management situation in Tennessee is no different from that in many states. The urge to hunt squirrels, particularly by the "old timers," becomes keener and keener in late summer with each passing day. To these persistent hunters the plague of hot weather and hordes of vicious mosquitoes are not serious barriers.

The desire to follow traditions of hunting squirrel in Tennessee during mulberry season, in June, and nut cutting time, in September, when squirrels concentrate is not as most people believe an important consideration in squirrel management. Squirrel hunting during these periods may be more aptly called "Mulberry Tree" and "Hickory, Pecan Nut Tree" hunts.

Some squirrel hunters aver that all the young are killed illegally before the season opens. An argument advanced, regardless of an early or late season, is that the farmer is too busy with crops to hunt.

There has been some controversy between still hunters and those who prefer to use tree dogs. It is contended that a late season shows favoritism to the latter group as foliage remains on trees until October 15.

In West Tennesee during the month of October, 26 percent of the total adult females killed were either suckling young or pregnant (Fig. 1). From a purely biological viewpoint, this would indicate that the 1950 - 51 squirrel season should open on November 1, at least in West Tennessee. The State Game and Fish Commission took into consideration these data and many other factors of importance when they advanced the squirrel season from September 1 in 1949 to September 30 in 1950. This appears to be a desirable compromise between the hunter's wants and the squirrel's welfare.

In Tennessee, squirrel breeding commences during late December or early January and continues throughout October and November, depending upon weather and physical condition of the squirrels. Arbitrary dates accepted as peak breeding periods in Tennessee generally are March - April and July - August.

The ability to alter correctly squirrel hunting dates in order to avoid peak breeding periods is of necessity a requirement of good management. However, an honest attempt should be made to set squirrel seasons that do not discriminate between hunters.

Final squirrel hunting regulations (seasons and bag limits) adopted by any commission or governing body, in most cases, are a compromise of all related and influencing problems, biologically and otherwise.

The need for advance conditioning of hunters to radical changes in season regulations is important and could eliminate a great deal of opposition and dissention. Those squirrel hunters in Tennessee who understood the reasons for setting the 1950 - 51 season have been most cooperative and sympathetic with our difficult squirrel management problem.