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EUROPEAN WILD HOG HUNTING SEASON RECOMMENDATIONS BASED ON REPRODUCTIVE DATA ¹

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ABSTRACT

Wild sows are physiologically capable of farrowing during any season of the year. However, there are two main farrowing periods; mid-winter (January and February) and early summer (May and June). To determine the importance of the different farrowing periods and the most appropriate time to subject the species to hunting pressure, the year was divided into three periods: December-March, April-July, and August-November. Based on the percentage of sows killed on managed hunts which were pregnant, the December-March period has the highest natality and litters are larger during this same period. The April-July period is when hunting would be most damaging to herd productivity because most of the adult sows are either pregnant or suckling, and death of the sows means death to the fetuses or dependent pigs. Most of the hogs killed during the managed hunts were born in the April-July period, indicating higher mortality among winter born hogs. The August-November period has the highest number of juveniles per female and is thus the period of the highest population. August would probably be the month best suited for hog hunting to minimize harmful effects to the reproductive capacity of the herd. Because an August hunting season is impractical, due to the climate and terrain, it is concluded that the fall hunts in November, as now conducted, are the most desirable of the possible hunting periods.

The European wild hog (*Sus scrofa L.*) has been the subject of a full time research project by the Tennessee Game and Fish Commission since 1959. This project has been conducted on the Tellico Wildlife Management Area in the Appalachian Mountains of southeastern Tennessee. During this study the hog has apparently not achieved its reproductive potential and has never been as numerous as other big game animals, such as deer (*Odocoileus virginianus*). The hog has several advantages over similar big game species in maintaining populations, particularly their omnivorous diet and greater productivity (4-5 young per litter). Because of these apparent advantages the failure to increase in numbers is a matter of some concern.

Possible limiting factors include hunting and non-hunting mortality, range capacity, reproductive failures, and interspecific and intraspecific competition. This paper summarizes available information on reproduction in wild hogs to determine if the present fall hunting season for

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the species may be a factor seriously curtailing herd productivity. The ultimate objective of this paper is to determine the time, or times, of the year best suited for hunting the species, to minimize harmful effects to the reproductive capacity of the herd by killing pregnant or suckling sows.

PROCEDURE

The data were obtained from hogs trapped and killed on the Tellico Wildlife Management Area. In the years 1959-1965 managed hunts were conducted during the latter part of October and the entire month of November, and trapping continued throughout the year except during the managed hunts. Reproductive tracts were examined from sows killed on the annual hunts and these yielded data on pregnancy rates, number and age of fetuses, and number of corpora lutea. The age of the fetuses were determined by comparing them with known age fetuses collected from captive European wild hogs. Information obtained from trapped hogs included female-juvenile ratios, pregnancy and suckling rates, and sizes of litters. Pregnancy was determined by visual inspection of the external appearance of sows' vulva and teats. Litter sizes and suckling rates were determined by examining the teats for evidence of lactation. Suckling rate represents the percentage of sows which are being suckled by unweaned pigs.

All hogs killed or trapped were either placed into different age groups up to 26 months of age or in a single age class of 26 months or older (Matschke, 1965). The approximate date of birth could thus be determined for hogs younger than 26 months of age when first trapped or killed.

Observations recorded in the past indicated there were two main farrowing seasons in wild hogs. One was in the winter, usually reaching a peak in January or February, and the other was in the spring and early summer, usually reaching a peak in May. For the purposes of this paper the year was divided into three seasons as follows: December-March, April-July, and August-November. Although backdating to determine birth dates has resulted in some borderline cases, the majority of the hogs for which the birth dates were determined were born within the limits of one of these seasons.

Mast crops were determined by surveying, with the aid of binoculars, the mast trees along the road system of the management area in August, before the mast began to fall.

RESULTS

Table 1 presents the pregnancy rates and female-juvenile ratios of hogs killed on the managed hunts in relation to the mast crop. A positive relationship appears to exist between the mast crops and the pregnancy rates and female-juvenile ratios. Matschke (1964) reported on the influence of oak mast on productivity of European wild hogs. Data are based entirely on reproductive tracts of adult sows examined by technicians because hunters apparently do not have the knowledge to differentiate between pregnant and non-pregnant sows.

The number of fetuses found in the reproductive tracts of sows killed during the annual hunts are presented in Table 2. Breeding and farrowing seasons for these sows can be found in Table 3. The average number of fetuses is higher during good mast years. Pregnant sows may be found from early August to early February, but most breeding occurs in late August (16 of 40) and September (20 of 40) and most births occur in December (19 of 40) and January (17 of 40).

Reproductive data collected from trapped animals can be found in Table 4. Recorded therein are litter sizes; suckling, pregnancy, and vulnerability rates; and female-juvenile ratios. The vulnerability rate represents the per cent of sows suckling or pregnant. The December-March period has the highest pregnancy rates and largest litters, while the April-July period has the highest suckling and vulnerability rates. The number of juveniles per sow is highest during the August-November period.

Birth dates calculated for all hogs that were under 26 months of age are presented in Table 5. Fifty percent of these hogs were born in April-July and 34 percent were born in the December-March period.

Data available on the survival of pigs are presented in Table 6. A large portion of those born in the April-July period show up in the annual kills or later trapping records than those born in the winter, thus indicating greater survival from non-hunting mortality.

DISCUSSION

Observations of captive European hogs indicate that sows rarely breed while suckling pigs. Sows normally breed again during the first heat period following the weaning of the previous litter. This is the reason for listing two different pregnancy rates; one concerning all sows and one concerning non-suckling sows.

Although it is possible to make mistakes in determining pregnancy rates of trapped hogs, the data collected indicate that mistakes were not common. Because pregnancy of trapped sows is not noticeable until the latter stages of pregnancy, data collected on pregnancy rates in

Table 1. Comparison of the pregnancy rate and female-juvenile ratio of European wild hogs killed during managed fall hunts in mast and non-mast years, Tellico Wildlife Management Area, Tennessee, 1959-1965.

Year	Reproductive		Pregnant Sows		Kill		Female-Juvenile	Mast
	Tracts	Examined	Number	Percent	Females	Juvenile	Ratio	Estimate
1959	25		16	64.0	-*	-	-	Good
1960	24		0	0.0	-*	-	-	Failure
1961	27		0	0.0	35	6	1:0.17	Failure
1962	0		-	-	4	0	1:0.00	Fair
1963	13		12	92.3	42	6	1:0.14	Good
1964	13		4	30.8	35	18	1:0.51	Fair
1965	8		8	100.0	29	9	1:0.31	Excellent
TOTALS	110		40	36.4	145	39	1:0.27	

* Hogs not aged

Table 2. Number of fetuses in pregnant sows killed during managed fall hunts, Tellico Wildlife Management Area, 1959-1965.*

Year	Source of Sample	Number Pregnant	Number of Fetuses		
			Total	Average	Range
1959	Examined by technicians	16	79	4.9	2-12
1959	Reported by hunters	7	35	5.0	—
	Subtotal: 1959	23	114	5.0	2-12
1960	Reported by hunters	3	13	4.3	—
1962	Reported by hunters	1	4	4.0	—
1963	Examined by technicians	11	55	5.0	4-7
1963	Reported by hunters	3	16	5.3	3-8
	Subtotal: 1963	14	71	5.1	3-8
1964	Examined by technicians	3	14	4.7	3-6
1964	Reported by hunters	2	8	4.0	—
	Subtotal: 1964	5	22	4.4	3-6
1965	Examined by technicians	8	40	5.0	3-8
1965	Reported by hunters	6	29	4.8	1-9
	Subtotal: 1965	14	69	4.9	1-9
1959-1965	Examined by technicians	38	188	4.9	2-12
1959-1965	Reported by hunters	22	105	4.8	1-9
	TOTALS	60	293	4.9	1-12

* No fetuses reported in 1961

December-March should be, and are, similar to that of sows killed on the annual hunts.

Because of the difficulty of distinguishing pregnancy of trapped sows until the latter stages of pregnancy, the period with the highest pregnancy rate would be the period of most births. The period with the highest suckling rate should be the four-month period following the period of most births.

December-March is thus indicated to be the period of most births because of its higher pregnancy rates. In fact, data collected from sows killed during the fall hunts indicate that in years of good mast all adult sows may farrow in this period. However, in years of poor mast it is probable that few or no sows farrow at this time.

Although most pigs are apparently born in the December-March period, survival of these pigs is lower (Table 6) and the majority of the wild hog population is composed of hogs born in the April-July period (Table 5). Further evidence of the reproductive importance of the April-July period and the possible harm hunting at this time would do is contained in the higher suckling and vulnerability rates.

Apparently, some sows farrow in the spring and summer when there is a mast failure the previous fall. Also sows which lose their litters in the winter apparently breed soon afterwards and then farrow in the early summer. Sows becoming sexually mature during the winter also farrow in the spring-summer period.

Table 3. Breeding and farrowing dates for pregnant sows killed during fall hunts, Tellico Wildlife Management Area, 1959-1965*

Date Killed	Number of Sows in the Sample	Estimated Breeding Date	Estimated Farrowing Date
11-2-59	1	August 9, 1959	December 3, 1959
10-15-59	1	August 12, 1959	December 6, 1959
11-2-59	1	August 19, 1959	December 13, 1959
11-23-59	1	August 20, 1959	December 14, 1959
10-27-59	1	August 23, 1959	December 17, 1959
10-22-59	1	August 28, 1959	December 22, 1959
11-2-59	1	August 29, 1959	December 23, 1959
11-23-59	1	August 30, 1959	December 24, 1959
10-20-59	1	Last of August	Last of December
11-3-59	1	September 1, 1959	December 26, 1959
12-1-59	1	September 4, 1959	December 29, 1959
11-3-59	1	September 9, 1959	January 3, 1960
10-29-59	1	September 14, 1959	January 8, 1960
1960	3	August 31, 1960	December 25, 1960
1962	1	Early October, 1962	Early February, 1963
1963	10	Middle of September, 1963	Early January, 1964
1963	2	Middle of October, 1963	Early February, 1964
11-6-64	1	September 2, 1964	December 26, 1964
12-28-64	1	September 10, 1964	January 3, 1965
11-10-64	1	September 21, 1964	January 14, 1965
11-10-64	1	October 1, 1964	January 24, 1965
11-9-65	1	August 5, 1965	November 29, 1965
10-29-65	1	August 19, 1965	December 13, 1965
10-29-65	1	August 20, 1965	December 14, 1965
11-2-65	1	August 26, 1965	December 20, 1965
10-29-65	1	September 1, 1965	December 26, 1965
10-29-65	1	September 25, 1965	January 19, 1966
10-29-65	1	September 26, 1965	January 20, 1966
TOTAL RANGE		August 5 - Mid-October	Nov. 29 - Early Feb.

* No fetuses reported in 1961

Table 4. Productivity of trapped European wild hogs during various seasons, Tellico Wildlife Management Area, Tennessee, 1961-1965.

Period	Litter Average*	Size Range	Suckling Rate	Pregnancy Rate 1***	Rate 2****	Vul. Rate**	Fem.-Juv. Ratio
Dec.-March, 1961	—	—	0.0	33.3	33.3	33.3	—
April-July, 1961	1.0 (1)	1-1	25.0	33.3	25.0	50.0	1:0.50
Aug.-Nov., 1961	—	—	0.0	0.0	0.0	0.0	1:0.50
Dec.-March, 1962	—	—	8.3	27.3	25.0	33.3	1:0.08
April-July, 1962	4.0 (2)	3-5	60.0	50.0	20.0	80.0	1:0.60
Aug.-Nov., 1962	—	—	50.0	0.0	0.0	50.0	1:5.50
Dec.-March, 1963	5.0 (1)	5-5	50.0	100.0	50.0	100.0	1:2.50
April-July, 1963	—	—	0.0	0.0	0.0	0.0	1:0.33
Aug.-Nov., 1963	3.0 (1)	3-3	40.0	33.3	20.0	60.0	—
Dec.-March, 1964	5.0 (1)	5-5	33.3	100.0	66.7	100.0	1:1.00
April-July, 1964	5.3 (6)	3-7	60.0	50.0	20.0	80.0	1:1.70
Aug.-Nov., 1964	4.0 (1)	4-4	33.3	25.0	16.7	50.0	1:4.17
Dec.-March, 1965	4.5 (2)	4-5	28.6	0.0	0.0	28.6	1:0.43
April-July, 1965	—	—	20.0	12.5	10.0	30.0	1:0.80
Aug.-Nov., 1965	—	—	20.0	0.0	0.0	20.0	1:0.40
TOTALS:							
Dec.-March	4.8 (4)	4-5	18.8	34.6	28.1	46.9	1:0.53
April-July	4.6 (9)	1-7	37.5	25.0	15.6	53.1	1:0.97
Aug.-Nov.	3.5 (2)	3-4	27.3	12.5	9.1	36.4	1:1.82
TOTALS							
TOTALS	4.5 (15)	1-7	27.9	25.6	18.7	46.6	1:1.02

- * Figures in parenthesis indicate number of litters in sample.
- ** Per cent of sows pregnant or suckling.
- *** Per cent of non-suckling sows pregnant.
- **** Per cent of total sows pregnant.

Table 5. Season of birth for hogs killed or trapped under 26 months of age, Tellico Wildlife Management Area, 1959-1965.

Period	Hogs Killed			Hogs Trapped	Hogs Killed or Trapped
	Untagged	Tagged	Total		
Aug.-Nov., 1959	3	—	3	—	3
Dec.-March, 1960	1	—	1	—	1
April-July, 1960	2	—	2	—	2
Aug.-Nov., 1960	1	—	1	—	1
Dec.-March, 1961	—	—	—	1	1
April-July, 1961	2	1	3	5	8
Aug.-Nov., 1961	1	—	1	—	1
Dec.-March, 1962	—	1	1	3	4
April-July, 1962	10	4	14	11	25
Aug.-Nov., 1962	3	1	4	3	7
Dec.-March, 1963	14	—	14	—	14
April-July, 1963	16	6	22	—	22
Aug.-Nov., 1963	12	1	13	1	14
Dec.-March, 1964	21	7	28	15	43
April-July, 1964	12	6	18	17	35
Aug.-Nov., 1964	7	—	7	2	9
Dec.-March, 1965	2	2	4	4	8
April-July, 1965	9	—	9	4	13
Totals:					
Dec.-March	38	10	48	23	71 (33.6) *
April-July	51	17	68	37	105 (44.8) *
Aug.-Nov.	27	2	29	6	35 (16.6) *
TOTALS	116	29	145	66	211 (100.0) *

* Figures in parenthesis represent per cent of the total.

TABLE 6. Survival data for trapped young of the year European wild hogs, Tellico Wildlife Management Area, Tennessee, 1959-1965.*

Season of Birth	Number Trapped	Killed		Trapped 1		Killed 1		Trapped 2		Killed 2		Trapped 3		Killed 3		Total Recoveries
		Year of Birth	Year After Birth	Year After Birth	Year After Birth	Year After Birth	Year After Birth	Year After Birth	Year After Birth	Year After Birth	Year After Birth	Year After Birth	Year After Birth	Year After Birth		
December-March 1960	26	2	0	0	0	0	1	0	0	0	0	0	0	0	0	3
December-March 1964	20	1	3	3	3	1	—	—	—	—	—	—	—	—	—	8
December-March 1965	8	0	0	—	—	—	—	—	—	—	—	—	—	—	—	0
TOTALS	54	3	4	3	3	1	1	1	1	1	1	0	0	0	11	11
April-July 1959	6	2	0	0	0	1	0	0	1	0	0	0	0	0	0	3
April-July 1960	2	1	0	0	0	0	0	0	0	0	0	0	0	1	0	2
April-July 1961	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
April-July 1962	14	0	0	3	3	2	2	2	2	2	2	0	0	0	0	7
April-July 1964	22	2	4	4	4	5	—	—	—	—	—	—	—	—	—	15
April-July 1965	5	1	4	—	—	—	—	—	—	—	—	—	—	—	—	5
TOTALS	52	6	8	7	7	8	2	2	8	2	2	0	0	1	1	32

* Hogs trapped in more than one year are entered in the table only for the last year trapped.

The larger number of juveniles per adult female during the August-November period indicate that this is the period of highest population. However, the smaller number of juveniles per female in the annual kills as compared with the trapping data indicate higher hunting mortality among adults and/or greater trap shyness of adults (A juvenile hog is a hog under seven months of age. Studies have shown that European hogs become sexually mature at this age). Lower vulnerability, suckling, and pregnancy rates during this August-November period adds further evidence that this is the period of optimum hunting opportunity while doing least harm to herd productivity.

It may be argued that the figures presented are misleading because during good mast years a lot of hogs that would have been born in the winter are lost when the pregnant sows are killed during the annual hunts. In defense it should be made clear that in years of poor mast many sows killed during the fall hunts would farrow in the spring and summer. Therefore, the fall hunting seasons affect the population as a whole and do not create an age structure made up primarily of hogs born in seasons other than the winter.

Although physiologically capable of breeding any season of the year, no evidence of a sow producing more than one litter a year, in a natural environment, has been found. However, the one litter a year could be born in any season, although the winter and spring-summer periods are most prominent.

A sow killed while pregnant or suckling almost invariably means death to the fetuses or dependent pigs. This is the reason for the emphasis on the vulnerability rate. A gestation period of 116 days, plus at least two months before weaning in wild hogs, means the sows would be vulnerable, in the manner described, for a period of at least six months.

For these reasons it is difficult to make any definite conclusions as to the absolute time of the year to hunt the species in order to prevent unnecessary mortality to young pigs and unborn fetuses. Probably the best time of the year for hunting would be the month of August and starting in the last of July, if necessary, instead of extending into September. Theoretically, this would be the time when the summer litters have become independent and breeding has not taken place for the winter farrowing period. However, it is bound to catch a few unweaned and/or pregnant sows. It would be extremely difficult to sell hunters on a season at this time because the climate and terrain may cause over exertion and heat exhaustion of hunters, and meat spoilage.

Therefore, spring and fall are the two possible hunting seasons. The month of April, and starting in late March, if necessary, would be the best time for a spring hunt. An experimental season at this time would be desirable for collection of data concerning spring and winter farrowing and the effect of a spring hunt on productivity. However, for hunting on a large scale, the fall hunting season now used is considered the best of the two alternatives, based on reproduction data collected to date.

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