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WALLOWS OF THE EUROPEAN WILD HOG IN THE MOUNTAINS OF EAST TENNESSEE

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ABSTRACT

During the period April, 1971, through March, 1972, the occurrence of European wild hog (*Sus scrofa*) wallows was recorded at different elevations and in different vegetation types in the mountains of East Tennessee. Forty-eight wallows were observed. Wallows were usually oval in shape and located in muddy depressions in trails, or in small streams with slow-moving water. The average size was 1.3 m x 1.0 m x 0.2 m. Wallows were found at the higher elevations from April to August and at the lower elevations from September to March. The seasonal location of wallows corresponds with changes in rooting activity and supports the hypothesis that European wild hogs may move seasonally at least partly for thermoregulatory reasons. The only vegetation types in which wallows were observed were cove hardwood and northern hardwood forests. Potential disease implications are cited.

INTRODUCTION

Since the original introduction of European wild hog (*Sus scrofa*) at Hooper's Bald, North Carolina, this animal has continued to increase in number and expand its range. As a major big game species, the European wild hog has been the subject of intensive research by the Tennessee Wildlife Resources Agency since 1959. Many aspects of the species natural history have been delineated. However, no data are available regarding a very common trait of all hogs, that of wallowing. Besides the physiological implications regarding body heat regulation, the locations of wallows of a wild population of hogs may give some indication of seasonal movements in relation to altitude and ecological site. More recently however, concern has been expressed regarding health considerations involving the possible contamination of water courses or sources and the potential of this species to serve as a reservoir for the transmission of parasites and diseases to man, livestock, and wildlife. Wallows in proximity to sources of drinking water that might be used by visitors to the Great Smoky Mountains National Park or Cherokee National Forest certainly have public health implications. The present study deals with an initial effort to locate and describe such wallows of the European wild hog in the mountains of East Tennessee.

STUDY AREAS

This study was conducted concurrently on two areas in East Tennessee. These were the Great Smoky Mountains National Park (GSMNP or Park) and the adjacent Tellico Wildlife Management Area (TWMA), Cherokee National Forest.

The GSMNP is a 2072 km^2 area (512,000 acres) located within Blount, Sevier, and Cocke Counties in Tennessee, and Swain and Haywood Counties in North Carolina. This area extends northeast along the Tennessee-North Carolina line from the Little Tennessee River and the southern portion of the Cherokee National Forest. The TWMA is a 325 km^2 tract (80,000 acres) of land within the 650 km^2 (187,973 acres) Tellico Ranger District of the Cherokee National Forest. This area, which lies entirely within Monroe County, Tennessee, extends south from the Little Tennessee River adjacent to the GSMNP and west from the North Carolina state line.

These two areas are located in the southern portion of the physiographic division known as the Great Smoky Mountains (the Unaka Mountain Range). Typical of this rugged division are the steep-walled V-shaped valleys and narrow winding ridge crests with sharp peaks. Elevations in the Park range from 271 m above sea level to 2025 m on Clingmans Dome, the second-highest point in the Eastern United States. The elevations in the TWMA range from 484 m to 1706 m.

The climate in the study area is generally humid. There is, however, a marked variation in local climates due to the high relief of the mountainous terrain. Temperature decreases at an average rate of 0.41°C per 100 m rise in elevation, and the higher peaks in the GSMNP average 5.5 to 9.0°C cooler than the base of the mountain during the growing season. This difference is approximately 2.5 to 4.0°C for the TWMA (Shanks 1954b, U.S. Forest Service 1970).

The vegetation of the Great Smoky Mountains is particularly rich in species and varied in community types. This vegetation has been adequately described by Cain (1931), Shanks (1954a), and Whittaker (1956). The classification of the vegetation by Shanks (1954a) was used during this study. This classification combines the numerous specific vegetation types into six broad physiognomic types. These six vegetation types include cove hardwood forests, hemlock forests, nothern hardwood forests, spruce fir forests, closed oak forests, open oak and pine stands-heath balds.

METHODS

From April, 1971, through March, 1972, European wild hog wallowing was noted with regard to its monthly occurrence at different elevations and in different vegetation types. This was done along established trails, cross-country trails, and roads

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in three watersheds in the GSMNP (105 linear km) and in three watersheds in the TWMA (55 linear km). Vegetation along the trails and roads was classified into types by an ocular estimate of the proportion in which the various species occurred. These vegetation types were marked on a topographic map.

When a hog wallow was observed, its location; dimensions (length, width, and depth); the plants in the overstory, understory, and ground cover; and the area conditions (muddy spot in trail or in a small stream) were recorded. Elevation for the wallow was determined by locating the point on a topographic map—contour interval 40 feet (12.2 m). Wallowing sites were placed into one of the six vegetation types described earlier. The above was done on the basis of the plants recorded in the vicinity of the wallowing site and by noting its location on the topographic map on which the vegetation types were marked. The mean elevation for European wild hog wallowing sites was calculated for each month by adding the elevation for each wallowing site observation and dividing the sum by the total number of observations in that month.

Results And Discussion

During this study, 48 hog wallows were observed, 30 in the GSMNP and 18 in the TWMA. These wallows were usually oval in shape and located in muddy depressions in trails or in small streams with slow moving water. Wallows were occasionally located adjacent to streams where a muddy spot had been left following high water. Seventeen (57 percent) wallows observed in the GSMNP were in a muddy depression in well-traveled foot trails, and the remaining 13 (43 percent) were in or around a small stream. In the TWMA, only four (22 percent) wallows were in a muddy depression in trails, and the other 14 (78 percent) were in or around small streams. The reason for the difference between the two study areas in the observed locations of wallows is that the majority of the trails traveled in the GSMNP were very well worn with numerous muddy depressions, whereas the majority of trails traveled in the TWMA were little used by man and were covered with typical forest litter.

The wallows in the GSMNP ranged in size from 0.6 x 0.6 m to 2.2 x 1.5 m with the average being 1.3 x 1.0 m. The wallows in the TWMA ranged in size from 0.6 x 0.3 m to 1.9 x 1.0 m with the average being 1.3 x 0.6 m. The average depth of wallows was 25 and 15 cm for the GSMNP and the TWMA, respectively. The larger wallows appeared to have been used by several animals at a time, while the smaller ones appeared large enough for only one individual.

The wallows in the GSMNP were at the higher elevations from April to August and at the lower elevations from September to March (Fig. 1). Stegman (1938:285) states that wallows in the Cherokee National Forest during the summer of 1937 were found chiefly near the upper ends of the higher coves in shaded, cool, and wet places. However, during this study, the number of wallows observed on the TWMA were too few to distinguish monthly patterns in wallowing. The bodies of swine are well insulated by a thick layer of subdermal fat, and because of the lack of any apparent thermoregulatory sweat glands, swine are better able to cope with cold temperatures than they are with hot temperatures (Mount 1968). The greater number of wallows occurring in the higher elevations during the warmer

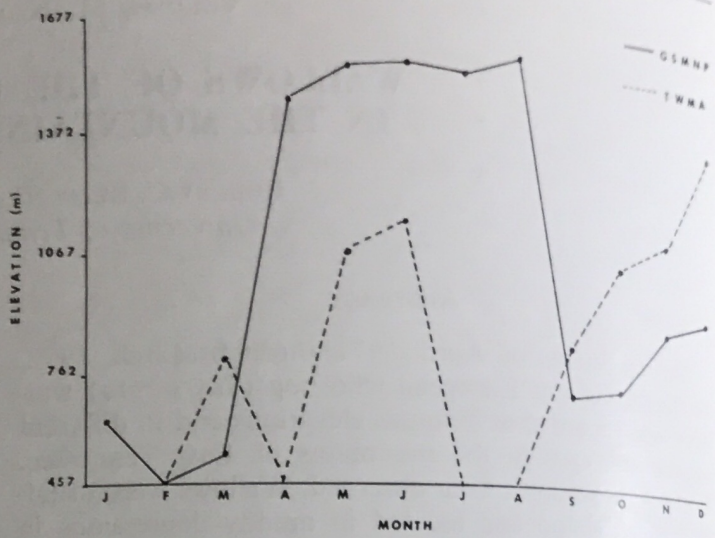

Fig. 1: *The mean monthly elevations for wallows of the European wild hog in the Great Smoky Mountains National Park and the Tellico Wildlife Management Area, Chreokee National Forest.*

months of the year aid in support of the hypothesis that one of the reasons the European wild hog moves to higher elevations is for thermoregulatory reasons (Belden 1972). The movement to higher (cooler) elevations and the wallowing in water or mud may compensate in part for the deficiency of sweat glands. Other studies (Belden and Pelton 1975, Fox 1972) support the shift by hogs to higher elevations in summer.

The only vegetation types in which wallows were observed were cove hardwoods and nothern hardwoods. Wallows in the GSMNP were observed in northern hardwoods during April through August, and in cove hardwoods for the remaining months. Wallows in the TWMA were all located in cove hardwoods except for two wallows in December, which were located in northern hardwoods. Wallows occurred only in cove hardwoods and northern hardwoods because these two vegetation types occur on the more mesic sites within both study areas.

With over 50 percent of the wallows occurring in or within close proximity to small streams the potential for human consumption of water from the same sources is feasible; this is particularly true considering the almost exponential increase in numbers of hikers and backpackers using the Park in the past five years. Preliminary analysis of water samples from the study area indicate hogs may be contributing to the bacterial loads of streams around which they root and wallow. No data are available regarding the recurrent use of individual wallows by hogs over an extended period of time. Domestic hogs are known to carry and transmit many diseases and parasites transmissable to man and other animals (Dunn 1970). However, the incidence of transmission of diseases by hogs in the wild is not known, particularly zoonotic diseases. The fact that these animals are free-roaming and widely dispersed when compared to domestic hogs likely decreases the changes of interspecific contact (directly or indirectly) and thus disease transmission.