

## MAMMALS OF MISSISSIPPI 3:1-6

### Swamp rabbit (*Sylvilagus aquaticus*)

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**Abstract.**—*Sylvilagus aquaticus* (Bachman, 1837) is a leporid commonly called the swamp rabbit. It is 1 of 4 species in the Subgenus *Tapeti*. The geographic range includes the Gulf States and small portions of more northern states in the southeastern United States. *Sylvilagus aquaticus* is found mainly in bottomland hardwood sites and floodplains. This species is known for its affinity for water and skill as a swimmer. *Sylvilagus aquaticus* is a popular game species in the southern portion of its range. However, declining population numbers due to habitat loss have made it a species of concern in several states on the northern edge of its range.

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### Swamp rabbit

*Sylvilagus aquaticus* (Bachman, 1837)

#### CONTEXT AND CONTENT

Order Lagomorpha, family Leporidae, Genus *Sylvilagus*, subgenus *Tapeti*. There are four species under the subgenus *Tapeti*. There are two subspecies of *S. aquaticus* (Wilson and Reeder 2005); *S. a. aquaticus* (Bachman, 1837) and *S. a. littoralis* (Nelson, 1909).

#### GENERAL CHARACTERS

*Sylvilagus aquaticus* (Fig. 1) is larger than the eastern cottontail (*Sylvilagus floridanus*) with an average total body length of 500 mm (Chapman and Feldhamer 1981) and mean body masses of 2117 g for adult females, 2214 g for adult

males, 1695 g for juvenile females, and 1682 g for juvenile males (Class 2006). Average tail length is 60 mm and average hind foot length is 100mm. Average braincase breadth is 27mm (Chapman and Feldhamer 1981) (Figure 2).

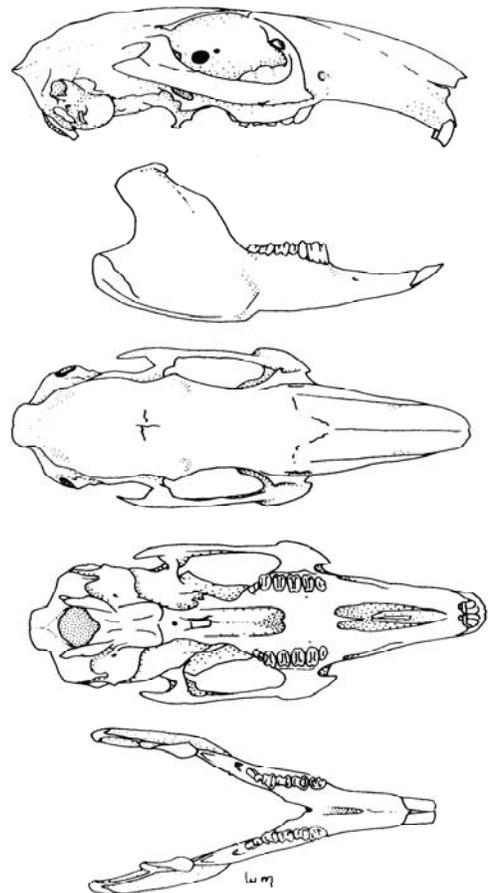


Figure 2. Top, lateral view of cranium and mandible; middle, dorsal view of cranium; bottom, ventral view of cranium and dorsal view of mandible of *Sylvilagus aquaticus*. (Courtesy of Smithsonian National Museum of Natural History).



Figure 1. Photograph by Glenn E. Wilson. Downloaded from wildlifenorthamerica.com. View Creative Commons License at creativecommons.org.

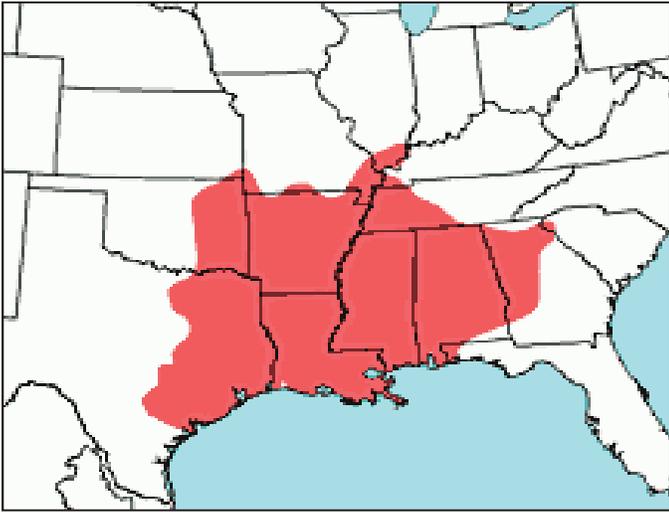


Figure 3. *Sylvilagus aquaticus* distribution map. (Courtesy of Smithsonian National Museum of Natural History).

Its ears are not excessively long, relative to body size, with an average length of 70mm. Its head and dorsal surface are dark brown or black, with a white ventral surface and tail, and black vibrissae (Chapman and Feldhamer 1981). The white ventral surface is developed as an adult characteristic. Young have a grayish coloration on both the dorsal and ventral surfaces (Lowe 1958). *Sylvilagus aquaticus* does not exhibit sexual dimorphism.

### DISTRIBUTION

*Sylvilagus aquaticus* occurs from eastern Texas to extreme western Florida, and north to Kansas and Indiana (Fig. 3) (Chapman and Feldhamer 1981).

### FORM AND FUNCTION

Members of the family Leporidae have short, dense fur, large ears, and exhibit digitigrade foot posture and saltatorial locomotion (Feldhamer et al. 2007). Females possess mammae for nursing of the young (Hunt 1959). Lagomorphs have heterodont dentition. A notable characteristic is the presence of peg teeth behind the upper incisors. The cheekteeth are hypsodont (Feldhamer et al. 2007). The dental formula is  $i\ 2/1, c\ 0/0, p\ 3/2, m\ 3/3$ , total 28 (Chapman and Feldhamer 1981). Lagomorphs have a cloaca and females possess a duplex uterus (Feldhamer et al. 2007).

*Sylvilagus aquaticus* is known to exhibit fear bradycardia. This physiologic response is characterized by decreased heart rate and a tendency to hide when threatened. The mean heart rate of a resting adult *S. aquaticus* is 200 beats per minute (Causby and Smith 1981).

### ONTOGENY AND REPRODUCTION

*Sylvilagus aquaticus* are synchronous breeders (Chapman and Feldhamer 1981). Females give birth to altricial young (Feldhamer et al. 2007). Young are born with well-developed fur but their eyes are closed and they are immobile. Their eyes have opened by day 3 and the young have begun walking (Hunt 1959). They are weaned and leave the nest after about 15 days (Chapman and Feldhamer 1981). Young are sexually mature at 7 months and reach adult weight at 10 months (Chapman and Feldhamer 1981).

Breeding season peaks in late January to February in Mississippi (Class 2006). Breeding season varies widely across the *S. aquaticus*'s range, occurring anywhere between February and August, and can occur year round in Texas (Chapman and Feldhamer 1981). Spermatogenesis has been noted to occur in *S. aquaticus* in Missouri in October and November (Toll et al. 1960). In a Mississippi study, groups of males harvested in December and February had the higher percentage of individuals with descended testes than those harvested in any other month (Class 2006). *Sylvilagus aquaticus* exhibit induced ovulation (Feldhamer et al. 2007) and have an hour-long estrous period (Chapman and Feldhamer 1981). The gestation period lasts 35 to 40 days (Chapman and Feldhamer 1981; Holler et al. 1963; Hunt 1959). Females can have 1 to 3 litters a year with each litter consisting of 4 to 6 young (Holler et al. 1963). Conaway et al. (1960) documented the occurrence of embryo resorption in *S. aquaticus*. This loss of in utero litters is attributed to some type of habitat disturbance such as flooding, which may cause overcrowding to occur.

## ECOLOGY

**Population characteristics.**—Though no density measurements were found for *S. aquaticus* in Mississippi, a Georgia study gave a density of 5.6 individuals per 100 acres (Lowe 1958). Studies in Mississippi found sex ratios in *S. aquaticus* to be relatively even, with each sex comprising 40 to 50% of the population (Class 2006; Palmer et al. 1991). Human hunting and habitat loss are the biggest threats to survival (Lowe 1958).

**Space use.**—In Mississippi, *S. aquaticus* are found in mature bottomland hardwoods, bottomland hardwood cut-overs (Palmer et al. 1991), and in old field and hedgerow habitats (Class 2006). Most *S. aquaticus* home ranges contain at least one standing body of water (Lowe 1958). As the name suggests, *S. aquaticus* is adapted to mesic sites. However, frequent or prolonged inundation can limit the availability of resources in *S. aquaticus* habitat. If this extensive flooding occurs in the home range of a population of *S. aquaticus*, some individuals may temporarily move into adjacent upland areas (Smith and Zollner 2001). *Sylvilagus aquaticus* will use hollow trees and burrows made by other animals as forms. Also, elevations such as logs and rocks are commonly used as latrines (Hunt 1959). The average home range of an adult *S. aquaticus* (both sexes) has been estimated to be 18.9 acres (Lowe 1958).

**Diet.**—*Sylvilagus aquaticus* eat a variety of herbaceous and woody plants. One study in Mississippi found that *S. aquaticus* depend heavily on crossvine (*Bignonia capreolata*) during the winter months (Smith 1982). Some of its other preferred foods are hop sedge or swamp grass (*Carex lupulina*), greenbrier (*Smilax* spp.) sumac (*Rhus* spp.), and blackberry (*Rubus* sp.) (Toll et al. 1960; Terrel 1972). *Sylvilagus aquaticus* will also eat several species of oaks (*Quercus* spp.) and hickories (*Carya* spp.) (Toll et al. 1960). *Sylvilagus aquaticus*, like many lagomorphs, practice coprophagy. This practice of reingesting feces provides the opportunity to

absorb nutrients that were missed the first time the plant matter was digested. Therefore, the species is adapted to survive on lower quality vegetation (Hirakawa 2001).

**Diseases and Parasites.**—There was no information found on this subject that referred specifically to parasites that affect *S. aquaticus* in Mississippi. However, a study by Hunt (1959) provided some information regarding parasites found on *S. aquaticus* captured in Texas. There are several parasites that may use the *S. aquaticus* as a host, including: a flea, *Hoplopsyllus affinis*; larva of the bot fly, *Cuterabra buccata*; a mite, *Psoroptes equi cuniculi*; the common chigger, *Eutrombicula alfreddugesi*; and the rabbit tick, *Haemophysalis leporis-palustris*. Also, four genera of helminth parasites were found: *Cittotaenia* sp., *Passalurus* sp., *Trichuris* sp., and *Obeliscoides* sp.

**Interspecific interactions.**—Most discussions about competitors of *S. aquaticus* center on *Sylvilagus floridanus*. The two species utilize separate niches, but in some cases there may be an overlap between *S. aquaticus* habitat and *S. floridanus* habitat (Toll et al. 1960). Other research suggests that *S. floridanus* is often found on the fringe of *S. aquaticus* habitat sites (Hunt 1959). Some research has been done investigating the relationship between *S. aquaticus* and the herbaceous and woody plants that make up its diet. A study in Arkansas revealed that percent cover of grasses, sedges, and herbaceous vegetation can be significantly altered by herbivory of *S. aquaticus* (Devall et al. 2001). Predators of the *S. aquaticus* include many carnivores such as the American mink (*Mustela vison*), the bobcat (*Lynx rufus*), and the coyote (*Canis latrans*). Owls and hawks are also known to hunt and kill *S. aquaticus* (Watland et al. 2007).

**Miscellaneous.**—Beagle chases have been shown as an effective method of mapping *S. aquaticus* home ranges (Toll et al. 1960).

## BEHAVIOR

*Sylvilagus aquaticus* are territorial. Two behavior patterns have been recognized. A linear dominance hierarchy exists among males, while females practice a mutual toleration. The second pattern is organization into breeding groups. The hierarchy is thought to prevent fighting between males. Also, males practice a pheromone-marking display known as "chinning" (Marsden and Holler 1964).

A series of mating behaviors has been documented in *S. aquaticus*. The female begins the sequence by chasing the male. The male responds by dashing away, then performing a jumping sequence. This is followed by copulation (Marsden and Holler 1964). Female *S. aquaticus* build nests shortly before parturition. The nests are bowl-like structures with 4 to 7 inch depressions, made from grasses or twigs woven together, and lined with fur (Holler et al 1963). The mother will nurse the young mainly at dusk and dawn. *Sylvilagus aquaticus* are considered to exhibit a high level of parental care because the mother will continue to nurse her young even after they have left the nest. Males have no parental role (Chapman and Feldhamer 1981).

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## GENETICS

There is very little information available on the genetics of *S. aquaticus*. The diploid number (2n) of *S. aquaticus* is 38 (Reudas and Elder 1994 not seen, cited in Reudas et al. 2000, Pp. 130).

## CONSERVATION

*Sylvilagus aquaticus* is a species of least concern according to the IUCN. However, it is a species of special concern in northern portions of its range. Research to assess the effects of late season harvest in states with declining populations may influence conservation efforts (Class 2006).

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