

Sylvilagus palustris. By Joseph A. Chapman and Gale R. Willner

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Sylvilagus palustris (Bachman, 1837)

Marsh Rabbit

Lepus palustris (Bachman, 1837). Type locality eastern South Carolina.

Lepus paludicola (Miller and Bangs, 1894). Type locality Fort Island, near Crystal River, Citrus Co., Florida.

CONTEXT AND CONTENT. Order Lagomorpha, Family Leporidae, Genus *Sylvilagus*, Subgenus *Sylvilagus*. There are about 14 recognized living species in the genus and 2 recognized subspecies of *S. palustris* (Hall, 1951; Hall and Kelson, 1959) as follows:

S. p. paludicola Nelson (1909:269). Type from Fort Island, near Crystal River, Citrus Co., Florida.

S. p. palustris Nelson (1909:266). No definite type; described from specimens obtained near the coast of South Carolina.

DIAGNOSIS. Size is small to medium, with dark brown body and small, slender, dark reddish to buffy feet. The tail is small; the underside is dingy (rarely white) in color. The ears are short and broad. The marsh rabbit is similar in color to the swamp rabbit (*S. aquaticus*), but is easily distinguished by the marsh rabbit's smaller size, dark underside of the tail, and small slender feet. The underside of the marsh rabbit is reddish brown and the nape is dark cinnamon rufous. The back, rump, upper tail, and hind legs vary from chestnut brown to a dark rusty red. The central abdomen is white, with the remainder of the belly being buff to light brown (Hamilton, 1963; Burt and Grossenheider, 1976).

GENERAL CHARACTERISTICS. Descriptions are in Nelson (1909) and Hall and Kelson (1959). The dental formula is $i\ 2/1, p\ 3/2, m\ 3/3$, total 28.

Some average external measurements (in mm) of adult *S. p. palustris* (five rabbits, sexes combined) are: total length, 436; length of tail vertebrae, 33; length of hind foot, 91; ear from notch in dried skin, 52. Some average cranial measurements for the same five rabbits are: basilar length, 63.4; length of nasals, 33.3; breadth of rostrum above premolars, 21.5; depth of rostrum in front of premolars, 16.4; interorbital breadth, 18.4; parietal breadth, 27.0; diameter of bullae, 11.6 (Nelson, 1909). The skull is illustrated in Fig. 1.

DISTRIBUTION. The range of the marsh rabbit extends from the Dismal Swamp, Virginia south through southern Georgia and northern Florida, and west to Mobile Bay (Fig. 2) (Hall, 1951; Hall and Kelson, 1959). Apparently this rabbit rarely occurs at altitudes above 152 m (500 ft) (Nelson, 1909).

FOSSIL RECORD. *S. palustris* has been found in late Pleistocene deposits at Melbourne, Florida (Gazin, 1950). Some Pleistocene specimens of *Lepus* sp. listed by Gidley (1927) are also referred to *S. palustris* (Gazin, 1950). A detailed discussion of fossil lagomorphs may be found in Kurtén and Anderson (in press).

ONTOGENY AND REPRODUCTION. In south Florida, the mean ovulation rate was 3.1, with a preimplantation loss of 0.2 ova per litter, and 0.1 embryos being resorbed per litter. The implantation rate was 2.8 embryos per pregnancy. Juvenile females had a mean ovulation rate of 2.7, an ovum loss of 0.4, and a mean implantation rate of 2.4 embryos per litter (Holler and Conaway, 1979). The litter size in Georgia is 3 to 5 (Harper, 1927).

The mean gestation period is not known, but Holler and Conaway (1979) estimated it to be between 30 and 37 days.

Marsh rabbits breed year around, although some anestrus females were found in all months. Natality varied from 0.5 to 0.7 young per female in November, to 1.8 to 2.4 young per female in March. The average number of litters produced per year for fe-

males that survived 12 months beyond sexual maturity was 5.7 or 6.9 depending on whether an estimated 37 or 30 day gestation period was used in the calculations. Adult male marsh rabbits in south Florida were sexually active year-round, while juveniles were active December through May. Testis weights and seminiferous tubules of males showed an annual cycle which preceded that of the females by about 1 month (Holler and Conaway, 1979).

A study of the nests of *S. palustris* showed them to be about 36 cm across (14 in) and about 20 cm (8 in) deep (Tomkins, 1935). The nests were constructed of soft grass and rabbit fur and had a floor about 2.5 cm (1 in) thick constructed of the same material. The nests were placed among burnt sedges approximately 9 m (30 ft) from the edge of the water. Young in the nest can exit from any side.

ECOLOGY. Unlike other *Sylvilagus*, the marsh rabbit is confined solely to marshy habitats (Blair, 1936). According to Tomkins (1935) these rabbits are most commonly found in brackish water areas, although at one time they were associated with freshwater marshes. In Florida, Blair (1936) noted that a small population was found in a "hammock" type of habitat, which contained trees such as magnolia (*Magnolia grandiflora*), tupelo (*Nyssa sylvatica*), and sweet gum (*Liquidambar styraciflua*), and shrubs such as blackberry (*Rubus betulifolius*) and dewberry (*Rubus continentalis*), which provided cover for the rabbits. In comparison, a larger population was found among the cattails (*Typha* sp.) that grew along the edge of a pond. Unlike other lagomorphs, the single most important factor limiting the distribution of this species is the availability of water (Blair, 1936).

The great horned owl (*Bubo virginianus*) and the marsh hawk (*Circus hudsonius*) are the main avian predators of the marsh rabbit. Remains of this rabbit have been found in nests of barred owls (*Strix varia*), barn owls (*Tyto alba*), vultures (*Cathartes aura*), red-tail hawks (*Buteo borealis*) and bald eagles (*Haliaeetus leucocephalus*). Potential mammalian predators include the grey fox (*Urocyon cinereoargenteus*), weasels (*Mustela* sp.), mink (*Mustela vison*), and alligators (*Alligator mississippiensis*). Water moccasins (*Agkistrodon piscivorus*) and diamondback rattlesnakes (*Crotalus adamanteus*) feed on immature marsh rabbits (Blair, 1936). The major causes of mortality of the marsh rabbit are human related activities, including fire and domestic dogs.

Several species of internal and external parasites have been identified for the marsh rabbit. Tomkins (1935) found that marsh rabbits were infested with the nematodes, *Dermatoxys veligera* and *Obeliscoides cuniculi*, and the cestodes, *Citotenia* sp. and *Cysticercus pisiformis*. The larvae of the bot fly, *Cuterebra* sp., were found in the skin by the neck and between the forelegs of the marsh rabbit (Blair, 1936). Ticks, *Haemaphysalis leporis-palustris*, and fleas were found on the ears, nose and around the eyes, and occasionally on the feet. In captivity, Blair (1936) found that rabbits died of a lung infection. Rabbits appeared listless, had no appetite and experienced difficulty in breathing prior to death.

Marsh rabbits feed on a variety of plant material. In the wild, Blair (1936) noted that rabbits consumed centella (*Centella repanda*) and *Smilax* sp. vines. Blair (1936) studied the food habits of marsh rabbits in captivity and found that they showed a preference for the herbaceous plants such as centella, marsh pennywort (*Hydrocotyle* sp.), cattail, rush (*Juncus* sp.), and water hyacinths (*Piaropus crassipes*). They also ate leaves and twigs from 18 species of trees, shrubs and woody vines, seeds and fruit from nine different plants as well as four species of cultivated crops including sweet potato (*Ipomoea batatas*) and carrots (*Daucus carota*). Marsh rabbits consumed approximately 28% of their body weight per day when fed *Centella repanda*, a favored food item. When deprived of water, Blair (1936) found that 10 captive marsh rabbits survived a mean length of 5.8 days (range 3 to 9).

Fecal droppings from marsh rabbits vary in color (including grey and red). The mean length, width, and weight of 34 marsh rabbit pellets were 9 mm, 8 mm, and 1.2 mg, respectively. Marsh

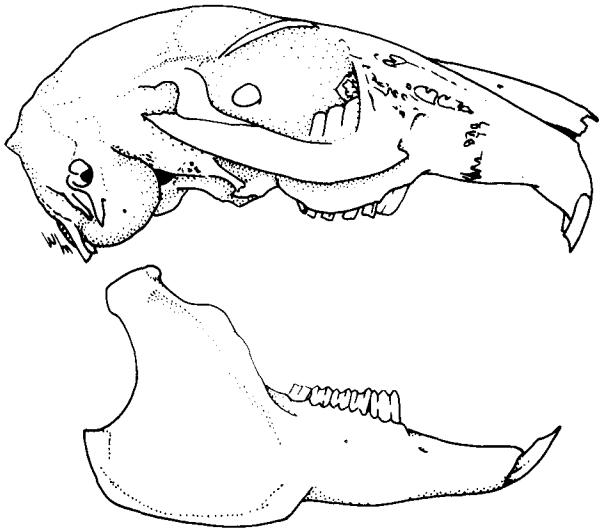


FIGURE 1. Skull of a male *Sylvilagus palustris* from Baker County, Georgia (NCSM 267). Above, lateral view of cranium and mandible. Middle, dorsal view of cranium. Bottom, ventral view of cranium and dorsal view of mandible. Drawing by Wilma Martin.

rabbits inhabiting "hammock" areas deposit scats in small piles on logs or stumps, while rabbits from marshy areas deposit pellets in larger piles along active runways (Blair, 1936).

BEHAVIOR. The marsh rabbit is primarily nocturnal (Tomkins, 1935). Blair (1936) found that the animals were most

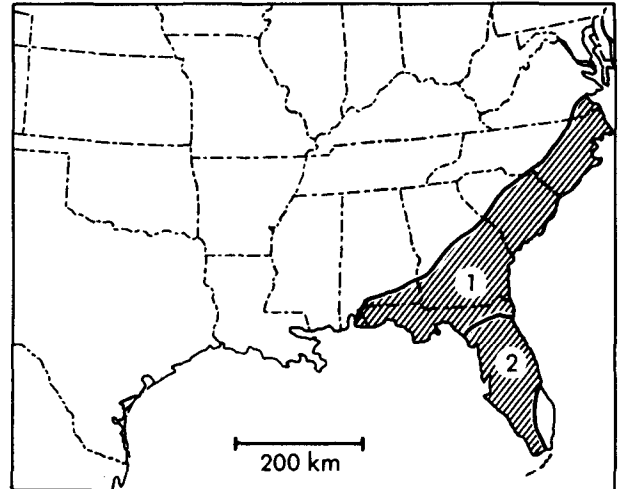


FIGURE 2. Distribution of *Sylvilagus palustris* and its subspecies in southeastern North America: 1, *S. p. palustris*, and 2, *S. p. paludicola* (adapted from Hall, 1951; Hall and Kelson, 1959).

active between 1900 and 0400 hours. Captive animals fed primarily during the night. During the day, wild rabbits spent their time resting on a form. Marsh rabbits have a small home range (Blair, 1936).

Unlike other *Sylvilagus*, marsh rabbits and swamp rabbits like to swim. Using an alternate paddling motion, marsh rabbits seem to enjoy swimming in warm water (Tomkins, 1935).

Captive marsh rabbits squeal when held. Crying sounds are frequently heard (Blair, 1936). Penned animals will bite or slap opponents to defend themselves. Both males and females fight one another (Blair, 1936). Marsh rabbits have an excellent sense of hearing and can readily detect motion (Blair, 1936).

Instead of hopping, this species usually walks, particularly when moving across soft mud. A marsh rabbit will spread its front toes in a resting position. Its tracks are readily distinguishable in mud by its exceptionally long toenails which have been described as being 13% longer than those in the common cottontail, *S. floridanus* (Tomkins, 1935). Although marsh rabbits do not live in burrows, they use their long toenails for digging holes (Tomkins, 1935). These holes are sloped at a 60° angle, and are about 30 cm (12 in) in depth.

REMARKS. Very little is known about several aspects of marsh rabbit biology. This is Contribution No. 1102 of the Center for Environmental and Estuarine Studies, University of Maryland.

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