Cricetomys gambianus **System:** Terrestrial

Kingdom	Phylum	Class	Order	Family
Animalia	Chordata	Mammalia	Rodentia	Muridae

Common name bush rat (English, Nigeria), pouched rat (English, Nigeria), giant rat (English, Nigeria), Gambian giant pouched rat (English), Northern giant pouched rat (English), African giant pouched rat (English), Gambian pouch rat (English), African giant rat (English), Gambian rat (English), rabbit (English, Nigeria)

Synonym *Cricetomys ansorgei* , Thomas, 1904

Similar species

Summary Native to Africa, the Gambian pouched rat (*Cricetomys gambianus*) has been introduced to the Florida Keys, United States. This large, highly fecund, omnivorous rodent poses a threat to native ecological communities in this area. It is also a vector of a number of diseases that affect humans, and is likely to be an agricultural pest if it reaches mainland Florida.

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Species Description
Gambian pouched rats are one of the largest species in the Murid rodent family, with larger males weighing up to 2.8 kg (Rosevear, 1969 in Perry *et al*., 2006). Males and females have an average weight of 1.5 kg and 1 kg respectively (Ajayi, 1975).
A distinctive feature of this species is the long tail (35-45 cm) that is virtually hairless, with the last third a creamy white colour (FWC, n.d.).
Gambian pouched rats are distinguishable from the one other species in the genus *C. emini* by their indistinctly defined venter, compared to the distinct white or cream coloured venter in *C. emini* and the dark eye ring and hairy ears, which are lacking in *C. emini* (Rosevear, 1969 in Perry *et al*., 2006).

Notes
While *Cricetomys ansorgei* Thomas, 1904 is listed as a synonym of *C. gambianus*, following Happold (in press, in van der Straeten *et al*., 2008) this taxon is most likely a species complex (van der Straeten *et al*., 2008).

Lifecycle Stages
Gambian pouched rats are born naked, pink and blind weighing 25-30g, which is dependent on litter size. Hairs start to cover the body at about five days and remain sparse for about 14 days. At about 5 days, the black and white parts of the tail become well defined. Both lower and upper teeth erupt simultaneously at about seven days and eyes are opened at 20-23 days (Ajayi, 1975). Males and females are sexually mature at about 20 weeks of age. Females have an oestrus cycle of 5-6 days (Ajayi, 1975).

Uses
Gambian pouched rats are commonly eaten in Nigeria (Ajayi, 1975).
Gambian pouched rats were popular pets in the United States until an outbreak of monkeypox in 2003, when the CDC and FDA issued an order preventing their sale, importation and transportation. In 2008 the ban on Gambian pouched rats as pets was removed, but they are still illegal to import from outside the United States (FDA, 2008).
APOPO, a Belgian demining research organization has been developing technologies for landmine detection using rats since 1996. Gambian pouched rats are trained to use their highly developed olfactory sense to detect landmines. They can also accurately detect tuberculosis from human sputnum samples (Christophe *et al*., n.d.; APOPO, n.d.).

Habitat Description
Gambian pouched rats are burrowing animals. They prefer cool, dry and dark places to locate their burrows as they are sensitive to heat (Ajayi, 1975).
In their native range in Nigeria Gambian pouched rats are found in degraded forests, forest clearings and margins, riverine areas and occasionally near human dwellings. Burrows are constructed near the roots of large trees, especially oil palm trees, and dead tree stumps. They also inhabit areas near termite mounds probably because these areas remain dry and cool in the rainy season Ajayi, 1975).
In their introduced range in Grassy Key, this species is common in rockland hammock habitat. They do not appear to inhabit wet shrub and mangrove habitats. They have also been recorded in modified and developed residential areas. They may not need to create their own burrows in the Florida Keys as limestone formations, trees, human dwellings and debris piles provide substitutes (Engeman *et al*., 2006).

Reproduction
Gambian pouched rats are highly fecund, reproducing up to 5-6 times a year with litters consisting of 1-5 young. Gestation times range from 27 to 42 days (Ajayi, 1975; Rosevear, 1969 in Ajayi, 1975). Laboratory studies show that they breed throughout the year without any seasonal peak in breeding (Ajayi, 1975)

Nutrition
Gambian pouched rats are omnivorous, and eat a very large variety of food items including vegetables, nuts, fruits, palm kernels, insects, crabs and molluscs. Rats collect food which is stored temporarily in their pouched jaws (Ajayi, 1975). They may make numerous foraging trips in a night, gathering food in their pouches and returning to their burrow to store it (Kingdon, 1984).

General Impacts

Disease vectors: Gambian pouched rats have been linked to several potentially pathogenic zoonoses (diseases that can be transmitted from animals to humans and *vice versa*) including leptospirosis, bartonellosis, trypanasomiasis and monkeypox. They were introduced into the United States in 2003 *via* a pet-trade shipment of African rodents (Hutson *et al*., 2007; Perry *et al*., 2006; Jenkins, 2007; Smith *et al*., 2009). The outbreak of monkey pox in 2003 caused the Center for Disease Control and Prevention (CDC) and Food and Drug Administration (FDA) to impose a ban of Gambian pouched rats as pets in the United States. This restriction was removed in 2008 (FDA, 2008).

Reduction in native biodiversity: Gambian pouched rats may threaten native and endemic fauna in the Florida Keys, including the Key Largo woodrat (*Neotoma floridana smalli*), Key Largo cotton deermouse (*Peromyscus gossypinus allapaticola*), Lower Keys marsh rabbit (*Sylvilagus palustris hefneri*), Stock Island tree snail (*Orthalicus reses*), and silver rice rat (*Oryzomys palustris natator*) which are listed as 'Endangered or Threatened' by the US Fish and Wildlife Service. (Perry *et al*., 2006 and references therein). Given their large size, fecundity and omnivorous diet Gambian pouched rats are likely to affect endemic species through increased predation and/or competition with (Perry *et al*., 2006).

Agricultural: Gambian pouched rats are known to cause substantial losses to food crops in Africa (Fiedler, 1988 in Witmer *et al*., 2010b). If these largely frugivorous rodents reach the Florida mainland they are likely to affect the Florida agriculture industry (Perry *et al*., 2006).

Management Info
Preventative measures: In 2007 *Cricetomys gambianus* was added to the list of Prohibited Species in Florida based on risks to Florida agriculture, native rodent species and human health (Hardin, 2007).
Potential sites for transfer of the rats to the mainland, such as transfer stations and highways, should be monitored to prevent or limit dispersal to new sites (Engeman *et al*., 2006).
Development of methods to detect and survey Gambian pouched rats is essential for measuring distribution and abundance, detecting incursions and assessing the effectiveness of control methods. Motion-triggered digital cameras with a lure of mineral oil and peanut butter provide an effective monitoring method, but cost and theft/vandalism are limiting factors. Tracking methods, which are more cost effective but more labour intensive provide a useful complement to cameras in areas where theft may be a problem (Engeman *et al*. 2006).
Chemical: Based on initial toxicant bait testing the two most effective baits were: the first generation anticoagulant, 0.005% diphacinone (Ramik minibars) and the acute 2% zinc phosphide bait (mixed with peanut butter and horse sweet mix). The Ramik bait needs to be consumed several times to be effective, whereas a small amount of the acute zinc phosphide bait is lethal (Engeman *et al*., 2006). Delivery of bait via bait stations made from PVC pipe ensure that native species are excluded (Engeman *et al*. 2006). Recommendations include prebaiting for three days to help prevent 'bait-shyness and bait station spacing at grids of no more than 50x50 m spacing (Engeman *et al*., 2006).
A pilot eradication was conducted on Crawl Key before attempting eradication on larger, heavier infested Grassy Key. A 40x40 m grid of bait stations was established using zinc phosphide bait. Preliminary camera surveys found no evidence of rats remaining, although further monitoring required to confirm eradication success (Engeman *et al*., 2007).
A similar effort was carried out on Grassy Key between May-June 2007. Zinc phosphide bait was used placed at 40x40 m grid in known areas with rats, and 50x50 m grid in all other areas, giving a total of 1000 bait stations. However this eradication was unsuccessful with rats detected soon after baiting (Engeman *et al*., 2007). The lack of success was attributed to several factors: not all landowners would allow baiting on their properties which may have provided refuge from bait (Engeman *et al*., 2007), use of bait stations which may have excluded some rats, or bait shyness (Witmer *et al*., 2010b).As the eradication on Grassy Key was unsuccessful there has been further research into evaluating different rodenticide baits and attractants. Zinc phosphide and brodifacoum were found to be the most effective poisons (Witmer *et al*., 2010b). The most effective attractant for detection and eradication of Gambian pouched rats from those tested was a blend of faeces and urine from conspecifics. Use of faeces and urine in combination with a second attractant such as peanut butter, anise extract, ginger or FAS (fatty acid) extract may be even more successful. Further testing should help to identify additional and potentially better attractants for Gambian rats (Witmer *et al*. 2010a).
Physical:Trapping has been used on Grassy Key, Florida for detection and removal, providing information on distribution and evaluating trapping techniques and impacts. While Gambian pouched rats are easily trapped using, large numbers of non-target species are captured, reducing the effectiveness of trapping (Engeman *et al*., 2007).
Trapping as an eradication method should probably only be used if Gambian pouched rats were discovered on keys within the range of endangered rodents, such as the Key Largo woodrat (*Neotoma floridana smalli*, as live traps allow safe release of non-target species (Engeman *et al*., 2006).

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