ENDANGERED ANIMALS

A Reference Guide to Conflicting Issues

Edited by
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Golden-rumped Elephant-shrew

Galen B. Rathbun and Solomon N. Kyalo

Common Name: golden-rumped elephant-shrew
Scientific Name: *Rhynchocyon chrysopygus*
Order: Macroscelidea
Family: Macroscelididae
Status: Endangered on 1996 IUCN Red List.
Threats: Isolated distribution where (1) subsistence trapping reduces numbers, and (2) agricultural and urban development and tree harvesting modify and eliminate habitat.
Habitat: Dry, semi-deciduous forest and coral rag scrub (scrub vegetation growing mainly on soils made of decomposed coral).
Distribution: Coastal forests north of Mombasa, Kenya, including small and isolated sacred forests (Kayas), the Arabuko-Sokoke Forest, and Boni Forest.

DESCRIPTION

The four genera and 15 species of elephant-shrews form a well-defined Order endemic to Africa (Nicoll & Rathbun 1990). They are believed to be distantly related to aardvarks and the Paenungulata (elephants, hyraxes, and sea cows) (Springer et al. 1997). The three species of giant elephant-shrews (*Rhynchocyon*) are found in different forests in central and eastern Africa. The golden-rumped elephant-shrew is only found in Kenya and has the most restricted distribution of any elephant-shrew (Corbet & Hanks 1968).

R. chrysopygus is the largest of the elephant-shrews, being the size of a small cat. The body length is about 280 mm, tail length is 240 mm, and weight is about 540 g (Rathbun 1979a). Its body shape is unique, resembling a cross between a miniature antelope and an anteater. The legs are long and spindly, and a long nose, large eyes, and moderately large ears dominate the face. Unlike most small mammals, golden-rumped elephant-shrews are very colorful with a dark amber body highlighted by a bright yellow rump patch, black legs and tail, and a grizzled gold forehead (Corbet & Hanks 1968).

NATURAL HISTORY

Golden-rumped elephant-shrews spend much of the day slowly walking about on the forest floor searching with their long noses for invertebrates in the dense leaf litter. Prey includes earthworms, millipedes, spiders, and

insects (Rathbun 1979b). They neither climb nor burrow, but when disturbed they take rapid flight across the forest floor. They sometimes take refuge in the hollow bases of large trees, if available. This elephant-shrew spends the night alone in one of several widely scattered nests that it builds on the ground with dead leaves (Rathbun 1979b).

Although much of the older literature describes *Rhynchocyon* as solitary, it actually exhibits a relatively rare social organization called facultative monogamy, whereby male/female pairs defend a joint territory by chasing away individuals of the same sex. Except for mating, however, members of a pair spend little time together (Rathbun 1979b; FitzGibbon 1997).

After a gestation of about 40 days, a single precocial young (independent, needing little parental care) is born in a leaf nest, where it stays for about 2 weeks. Females can produce up to six litters per year, but the males do not assist in raising the young (Rathbun 1979b). In primary forest, golden-rumped elephant-shrews may reach densities of 68/km^2, but in poorer habitats their densities are usually below 25/km^2 (FitzGibbon 1994).

CONFLICTING ISSUES

The coastal dry forests of eastern Africa are relatively small, isolated, and highly threatened (Burgess et al. 1996). In these forests live numerous species of amphibians, reptiles, birds, and mammals that are found nowhere else. For example, the Arabuko-Sokoke Forest, located between Mombasa and Malindi in Kenya, supports three endemic mammals, including the golden-rumped elephant-shrew. The fate of these animals rests in the fate of their forest habitat (Nicoll & Rathbun 1990), which is under increasing pressure from an expanding human population.

Although the Arabuko-Sokoke Forest is protected and managed by the Kenya Department of Forestry, there is increasing pressure to clear parts of the forest for urban, agricultural, and commercial uses. In addition, a legal and illegal selective tree harvest is changing the composition and structure of the forest, which in turn is threatening the golden-rumped elephant-shrew.

The coastal forest north of Mombasa has a long history of human use, as shown by the 13th- through 17th-century Swahili/Arab ruins at Gedi, near Malindi. The indigenous Sanya people were hunter-gatherers in the forest and led a mobile existence, but about 100 years ago the Mijikenda people arrived in the area, resulting in more permanent settlements and an expanding population (FitzGibbon et al. 1995).

As the number of people living near the coast has increased (by 3.8% per year), so has the need for forest products, agricultural land, and building sites for homes (Burgess et al. 1996). Over the last 100 years the structure and composition of the forest have changed greatly as poles, hardwoods, and firewood have been selectively extracted (Mogaka 1991). In addition,

two significant and obvious changes have occurred in the distribution of the coastal forest. First, its area has been greatly reduced. Second, the remaining forest has become fragmented.

In 1943, 418 km^2 of forest were officially protected as the Arabuko-Sokoke Forest Reserve. Today, this area plus a few additional square kilometers of unprotected forest is all that remains of the estimated 1,000 km^2 of original coastal forest between Mombasa and Malindi. The loss has been owing to clear-cutting for various activities, including cashew nut and coconut plantations, charcoal production, exotic timber plantations, and cash crop and subsistence farming (Mogaka 1991).

The reason the forest has become fragmented is unique. Scattered throughout the region are about 45 sacred Mijikenda sites called *Kayas*, which are often associated with a cave or hilltop. Each *Kaya* usually includes from 10 to 300 hectares of forest that has been protected because of traditional beliefs (Hawthorne 1993). However, as tribal traditions are lost, so are the practices associated with protecting the forests on the *Kayas* (FitzGibbon 1994). In addition, as the unprotected forest between these sites has disappeared they have become isolated, and the wildlife in the forest patches, including the golden-rumped elephant-shrew, is now prone to extirpation.

As tourism has developed in Kenya, the Kamba people have developed a very successful and lucrative woodcarving industry. For example, it is estimated that 60,000 carvers produce rhinos, impala, giraffes, and the like with a yearly export value of about U.S. $20 million. Much of this success can be attributed to the effectiveness of several cooperatives, such as the Akamba Handicraft Cooperative in Mombasa, and another in Malindi. Over the years, however, the carvers have depleted many of the favored species of trees in Kenya's forests, including the mahogany, or muhugu (*Brachylaena huillensis*), from the Arabuko-Sokoke Forest (Marshall & Jenkins 1994), which the elephant-shrews use for shelter.

To better understand the ecological impacts of logging on wildlife, Kyalo (1997) tallied how many of 515 muhugu trees that were felled had hollow trunks and harbored wildlife. He found 91 of the 515 trees actually had *Rhynchocyon* in their hollow trunks. Kyalo estimated that 20,800 muhugu trees are harvested per year from the Arabuko-Sokoke, and that about 9,360 of these would be hollow. He further estimated that 4,200 of the hollow trees would be used by golden-rumped elephant-shrews for shelter. How important are these hollow trunks to the elephant-shrews?

Gedi Historical Monument is a 44-hectare isolated patch of forest that once was connected to the main Arabuko-Sokoke. In this regard it resembles the many isolated *Kayas* in the region. Rathbun (1979b) did his ecological studies of *R. chrysopygus* at Gedi in the early 1970s. When FitzGibbon (1994) began her fieldwork in the area 20 years later, she found that marauding dogs belonging to people living around the forest at Gedi had

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NATURAL HISTORY

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decimated the elephant-shrew population. Because virtually all of the old-growth trees with economic value have been harvested from this isolated forest, few hollow trees remain. Without these shelters, fleeing elephant-shrews have no secure escape from dogs. Is this to be the fate of the golden-rumped elephant-shrew, as the coastal forests become increasingly fragmented, surrounded, and used by more and more people? Coastal elephant-shrew populations, similar to other vertebrates that inhabit isolated fragments of forest, are very susceptible to this type of human-related extirpation, as well as to extinction from unpredictable or random natural events such as severe storms.

Although wildlife trapping and hunting in the Arabuko-Sokoke Forest is regulated by the Kenya Wildlife Service and the Kenya Department of Forestry, the illegal subsistence harvest of all mammals, including the golden-rumped elephant-shrew, has increased in recent years as the forest has shrunk and the human population has expanded (FitzGibbon et al. 1995). Although there are over 1,000 households hunting and trapping in the Arabuko-Sokoke, trapping only occurs in about 40% of the forest, mostly around the edges. The result is that the edges are depleted of elephant-shrews while the interior serves as a source. The densities of *R. chrysopygus* in the Arabuko-Sokoke average about 59 individuals/km^2, whereas the harvest is 8/km^2 and the maximum sustainable harvest is estimated at 20/km^2. Apparently the current level of illicit trapping is sustainable (FitzGibbon et al. 1996).

However, there are other issues. Elephant-shrews, being diurnal and showy animals, could attract tourists, which would mean income for forest management as well as local families. But animals must become tolerant of people and their densities must be high if they are to be viewed and photographed. This will not happen if trapping is allowed. Subsistence harvest is an important source of protein for the local people. In addition, when trapping and hunting are allowed, local support for forest and wildlife management is garnered. Without this support, future forest conservation efforts may not be successful. On the other hand, should a species that is endangered with extinction be harvested? If a regulated and sustainable harvest is allowed, will it encourage more trappers to venture deeper into the forest, thereby disrupting the delicate balance that now exists? FitzGibbon et al. (1996) suggest that the current "loose arrangement," with trapping around the perimeter, may be a workable compromise, but it needs a monitoring program to ensure that the elephant-shrew population does not decline further.

FUTURE AND PROGNOSIS

As pointed out by Turner and Corlett (1996), small and isolated fragments of forest are probably not as effective in preserving biodiversity as are

large blocks of forest, but small patches are definitely more useful as sources of plants and animals for future conservation efforts than are urban and agricultural areas. For this reason, we commend the National Museums of Kenya for protecting the cultural and biological value of the 30 *Kayas* that have been designated as National Monuments, and we hope that the remaining *Kayas* will also be protected.

The depletion of hardwoods in Kenya's forests has not gone unnoticed by the woodcarvers and their cooperatives. They are being assisted in developing solutions to the problem by national and international conservation organizations. In association with the Mennonite "Ten Thousand Villages" project and the "People and Plants Initiative" of the World Wide Fund for Nature (WWF), UNESCO, and the Royal Botanic Gardens at Kew, woodcarvers are trying to (1) diversify the types of woods favored by tourists, and (2) develop agroforestry systems and plantations as an alternative source of hardwoods (Cunningham 1998). These programs offer real hope that in time one of the threats to the habitat of the golden-rumped elephant-shrew will decrease.

If some form of legal elephant-shrew harvest is allowed, we believe it will require not only a monitoring program to ensure that the trapping is indeed sustainable (FitzGibbon et al. 1996) but also some form of efficient regulation. However, regulating wildlife trapping will be tricky. In areas where the standard of living is low, funding of programs is difficult and there is great temptation for corruption by administrative and field staff with regulatory roles. Unless these problems are satisfactorily addressed, it is likely that elephant-shrew trapping cannot be managed adequately and thus not sustained.

Total protection is very attractive, given the difficulty of implementing a sustainable harvest, the highly restricted and fragmented distribution of *R. chyrsopygus*, and its vulnerable natural history. "But conservation is a human problem, not a biological problem. Conservation will not succeed unless human needs are catered for and adequate alternative resources provided" (Rodgers 1993:318). Perhaps a conservation effort similar to the grass roots effort that is evolving with the woodcarvers (Cunningham 1998) will develop for wildlife itself and thus generate alternative resources and support for conservation.

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Golden Lion Tamarin *(Leontopithecus rosalia)*. Photo by J.M. Dietz. Courtesy of J.M. Dietz.

Golden-rumped Elephant-shrew *(Rhynchocyon chrysopygus)*. Photo by G. Rathbun. Courtesy of G. Rathbun.