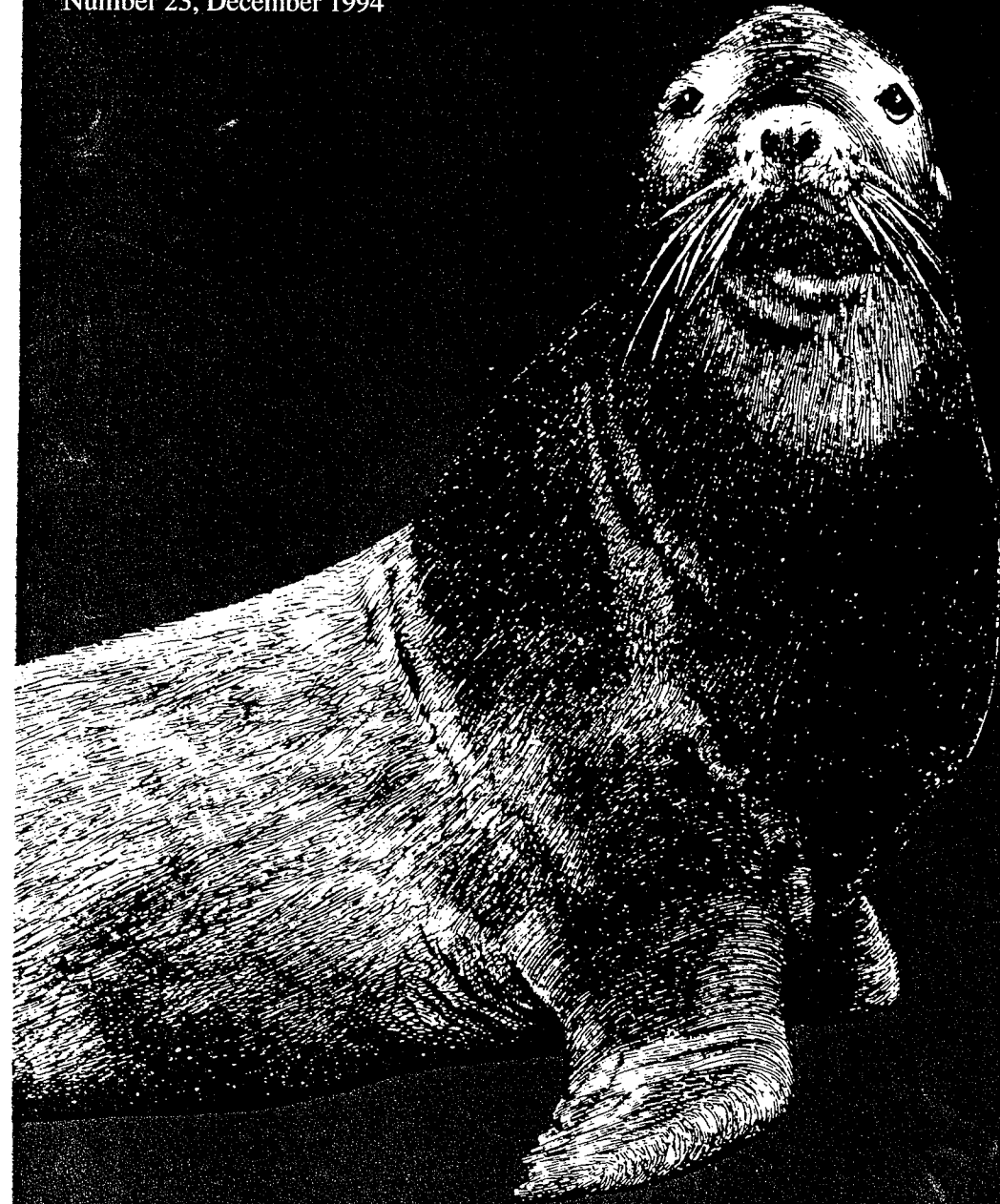


# Species

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## Insectivore, Tree-Shrew, and Elephant-Shrew Specialist Group

Peter J. Stephenson



### Habitat Disturbance Threatens the Tenrecidae of Madagascar

Madagascar has long been identified as an international conservation priority. Most of the attention on species conservation has focused on lemurs, but recent research has brought to light the threats facing the island's small mammal fauna, most especially the Insectivora.

Besides two apparently widespread species of shrew, Madagascar's insectivore fauna comprises endemic species of the Tenrecidae. Precise species richness is unclear due to taxonomic confusion surrounding shrew-tenrecs of the genus *Microgale*, but there are probably more than 26 tenrec species on Madagascar in total. This means they are the second largest group of extant mammals on the island after primates and, as such, a significant component of the country's biodiversity.

Most tenrecs are found in eastern rain forests, but many species are known from only a small number of specimens so limited information is available on species distributions and habitat requirements. The African Insectivore Action Plan advocates extensive surveys to determine the status of Malagasy insectivores. It assumes that many species will be protected by the establishment and effective management of sufficient numbers of nature reserves. However, recent evidence suggests that certain species may be more susceptible than others to habitat disturbance and that in protected areas managers must take account of the often-overlooked insectivore fauna.

A recent study into the small mammal fauna of Analamazaotra Special Reserve in east Madagascar demonstrated that endemic species richness was reduced in habitats disturbed by tree felling or tourist activity. Sites regularly visited by tourists to watch lemurs exhib-

ited the lowest level of insectivore diversity, even though habitat disturbance at these sites was largely restricted to trampling. Ecotourism can have beneficial consequences for local and national economic development, but besides the apparent reduction in insectivore diversity where human activity is greatest, potential impacts include direct interference with wildlife, socio-economic disruption to local communities, and general environmental degradation. Although there are probably few significant detrimental environmental effects of tourism to date, there is a fear that uncontrolled expansion of tourism activity could threaten the integrity of Analamazaotra and other protected areas in Madagascar. The impact of habitat change varies between insectivore species. Small tenrecs of the subfamily Oryzoricinae, such as small shrew-tenrecs (*Microgale spp.*) and fossorial tenrecs (*Oryzorictes hova*), were only trapped in undisturbed forest at Analamazaotra and were assumed to be most vulnerable to disturbance. Indeed, recent records of fossorial tenrecs suggest that some oryzoricine species may be less widespread and more dependent on primary rain forest than previously thought.

The tenrec species identified as conservation priorities in the African Insectivore Action Plan include mostly small *Microgale* species since these are either insufficiently known or have indeterminate status. It now appears that it may be these poorly known species that are at greatest risk from habitat disturbance. The Malagasy species identified as the greatest conservation priority is the aquatic tenrec (*Limnogale mergulus*). This species appears to depend on permanent, clean, fast-flowing water with an abundance of aquatic prey. It must be assumed that deforestation will lead to soil erosion and the silting up of river systems, but no study has yet been con-

ducted into the effects of habitat disturbance on this rare insectivore. Local extirpation of aquatic species such as *Limnogale* can be more serious since they generally find it more difficult to recolonize areas, especially if they are eradicated from entire river systems.

## Conclusions

Although areas of rain forest in Madagascar may appear to be effectively conserving species when large mammals such as lemurs are present, even relatively minor anthropogenic disturbance may cause subtle habitat changes that affect insectivore distributions and cause local reductions in biodiversity. There is urgent need to implement the recommendations of the African Insectivore Action Plan and conduct extensive surveys to determine species distributions and habitat requirements throughout eastern rain forests. Studies should concentrate on small species of terrestrial and fossorial oryzoricine, as well as the aquatic tenrec.

A program of survey and monitoring should be established in Malagasy protected areas to assess the environmental impact of tourism and other human activities. There is a general need throughout the country for active management of tourist activity and the provision of interpretive information reserves.

Core areas of rain forest reserves should be left undisturbed to safeguard a sufficient diversity of habitats. This should ensure the long-term conservation of the insectivore fauna and maintain biodiversity within this diverse ecosystem.

*Peter J. Stephenson, Member  
Insectivore, Tree-Shrew, and  
Elephant-Shrew Specialist Group*