



## Case Report

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# On the Destruction of Threatened Endemic Insular Bats Roosts: The Case of the Macaronesian Madeira *Pipistrelle Pipistrellus maderensis* (Mammalia: Chiroptera) On Madeira Archipelago

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## Introduction

The Madeira *Pipistrelle Pipistrellus maderensis* is a small vespertilionid bat, endemic to the macaronesian archipelagos of Madeira, Azores and the Canary Islands (Teixeira, [1]). The species is threatened of extinction (Alcalde & Juste, [2]) and is one of the most threatened species of bats in Europe (Barova & Streit, [3]). Madeira pipistrelles metapopulations have become extinct on several islands of the Madeira and Azorean archipelagos, due to post-human colonization habitat destruction (Teixeira et al, [4]). The population of *P. maderensis* faces several survival pressures, namely habitat fragmentation, persecution, urban growth and forest fires (Teixeira et al., [5]). Collectively, these pressures exert a significant deleterious effect on *P. maderensis* populations, their roosts and feeding areas. Tourism led urban growth is a common pressure on urban and sub-urban areas, while persecution affects the species

more strongly on rural areas and the forest fires on natural areas. Despite these menaces to the species survival are known, none has been reported thus far, hindering a proper conservation status evaluation under IUCN criteria based on published information (D. Russo, personal observation).

## Cases Reported

*P. maderensis* roosts were located on Madeira and Porto Santo Islands and were all located on anthropogenic structures, in different types of soil occupation and distances from urban areas (Table 1). The roosts Galhano and Ribeira Seca were located within Natura 2000 Special Area of Conservation PTMAD0001 Laurissilva da Madeira. The destruction of each roost was caused by different types of anthropogenic pressures (Table 2).

**Table 1:** Roosts of Madeira pipistrelles *P. maderensis* on the Islands of Madeira and Porto Santo, in Madeira archipelago, where destruction events were recorded.

Roost	Location	Soil occupation	Nearest village	Number of bats	Roost type
Galhano	P. Moniz	Forest	5 168 m	unknown	Maternity
Santa	P. Moniz	Rural	1 037 m	100	Maternity
Terreiro I	Terreiro da Luta	Suburban	556 m	56	Maternity
Pernais	Cancela	Suburban	305 m	42	Summer

Portada	Funchal city	Urban	0 m	34	Maternity
Ribeira Seca	Faja da Nogueira	Forest	6 250 m	1	Breeding
Palheiro	Chão da Ribeira	Rural	2 206 m	26	Maternity
Parede	Camara de Lobos	suburban	1 124 m	Unknown	Temporary
Florenças	Calheta	Rural	1 296 m	Unknown	Maternity
Salgado	P. Santo	Suburban	429 m	20	Summer

**Table 2:** Identified pressures and means of destruction used to destroy roosts.

Roost	Pressure	Action
Galhano	Persecution	All bats killed using cloth with diesel and set on fire (to kill witches)
Santa	Persecution	All bats killed by burning sulfur wicks at roost (to kill witches)
Terreiro I	Fire	All bats killed by forest fire smoke
Pernais	Persecution	All bats killed by using Lanat agrochemical
Portada	Urban growth	Roost destroyed for rebuilding purposes
Rib. Seca	Persecution	Roost entrance cover by concrete.
Palheiro	Urban growth	Roost destroyed for rebuilding purposes
Parede	Persecution	Roost entrances cover by concrete.
Florenças	Persecution	Roost entrances cover by concrete (to kill witches)
Salgado	Persecution	Birds and bats killed using an unidentified chemical compound

## Results and Discussion

On 90% of the recorded events, the destruction of the *P. maderensis* roosts was caused by direct human intervention, namely persecution with intent to kill all animals. The majority of the roosts destroyed were maternities, which composed 60% of the events. The most common means to destroy roosts were by using chemicals or agrochemicals to kill all bats inside the roosts (40% of events) or covering roost entrance with concrete (30% of the events), thus blocking all animals inside. Only 30% of the events were caused by other pressures such as climate change induced forest fires (10% of the events) and buildings refurbishment works, indirectly caused the destruction of 20% of roosts. Most of the events took place on Suburban areas (40% of events) and rural areas (30% of events), totalling 70% of roosts.

One important identified risk for Madeira pipistrelle bats was that even the roosts Galhano and Ribeira Seca, located at a mean distance of 5,7 Km to nearest human areas in forested areas under the protection of the Habitats Directive and within the Madeira Nature Park protected areas, were still destroyed by direct human action. This is a strong indicator that habitat protection is not enough to prevent persecution and roost destruction, and, therefore, surveillance and monitoring of known roosts is required to halt the population declines of *P. maderensis*.

On Madeira archipelago, human persecution is the primary threat on *P. maderensis* survival, even more than predation by IAS (Teixeira, upcoming). Even though many awareness campaigns have been made in rural and suburban areas, people consider bats

as witches or evil creatures, thus leading to the persecution of these small mammals. Therefore, the efforts to improve *P. maderensis* conservation status and halt roost destruction and population declines should be persistent on these areas of the Islands of the Madeira archipelago. Also, since the identified highest threat to *P. maderensis* roosts are humans, namely landowners on rural areas, local authorities and conservation projects should consider the installation of bat boxes or custom-made roosts in suitable rural public land, thus facilitating the installation and conservation of Madeira pipistrelles while hindering the destruction of roosts of this endangered endemic insular species.

## References

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