

Nubra valley. Some incentives to camel owners may be offered, like starting camel insurance programmes, providing loans for purchase of camels, loans for construction of housing facilities, etc.

(2) The community grazing areas should be protected from encroachment. Attempts should be made to reduce conflict among camel farmers and other villagers arising due to the camels entering agriculture land.

(3) Small-scale industries/cottage industries for processing/manufacturing camel-based products should be encouraged. Camel hairs are used for making blankets, shawls, sweaters, gloves, etc. About 3–4 kg camel hair is obtained from one adult animal during April–May each year. Leather is not obtained from the dead camels. The camel hair/leather-processing plants could be established and farmers may be encouraged by providing subsidies for their establishment.

(4) Villagers may be encouraged to keep pregnant camels indoors and provide them balanced ration, so that they can give birth to calves under supervision. This would prevent parturition in the community grazing areas and reduce neonatal mortality due to attack by predators or some other reason. Newborn calves should not be allowed to go to the community grazing areas for at least 2–3 months.

(5) Complete feed-block or other kinds of feed supplements which can meet the

nutritional deficits of camels during lean (winter) season and scarcity conditions in the valley should be made available. If possible, feed/fodder processing units should be established and feed supplements based on locally available ingredients could be developed.

(6) People in Nubra valley neither practice camel milking nor consume camel milk. They should be encouraged to train the female camels for milking and include milk yield traits in selective breeding programmes. The milk of double-humped camel should also be evaluated for its nutritional and medicinal properties. Production of value-added products from camel milk during tourist season will enhance the income of camel farmers.

(7) Facilities for camel healthcare should be developed in the valley. Availability of medicines and trained veterinary personnel should be ensured throughout the year.

(8) Training should be provided to camel farmers regarding normal restraining and handling and on different methods of animal identification, like hot/cold-branding, tattooing, tagging, bar coding, etc.

(9) Farming of double-humped camels may be started in other parts of Jammu and Kashmir as well where conducive environmental conditions exist. Their widespread use in tourism activities may help secure livelihood of the people

as well in the conservation of these camels.

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An unusual roosting behaviour of Schneider's leaf-nosed bat, *Hipposideros speoris* at a cave-temple roost in Tamil Nadu

Bats are involved in the essential ecosystem services such as pollination, seed dispersal and insect control^{1–3}. However, a multitude of factors like anthropogenic disturbance, climate change, habitat loss and emerging diseases have greatly affected bat communities across the globe with many species facing population contraction and local extinction^{4–6}. Such drastic decline in ecologically important communities may result in unpredictable and often irreparable changes in the ecosystem structure and function⁷.

In many temple premises in Tamil Nadu, bats are considered as a nuisance and considerable amount of money is spent to get rid of them. For example, a

decade and half ago about 15,000 individuals of *Rousetus leschenaulti* used to roost inside Cheranmahadevi temple near Tirunelveli⁸; but recent observations reveal that these bats have completely abandoned this roost. Similarly, at the Kuthungal cave in Idukki district, Kerala, killing and human consumption have led to a drastic decline of the resident *R. leschenaulti* colony⁹.

Under such a scenario of widespread persecution of bats, we report an unusual roosting behaviour of the Schneider's leaf-nosed bat, *Hipposideros speoris* from the Muthaiyan cave temple roost in Tamil Nadu¹⁰. This insectivorous bat prefers to roost in dark and inaccessible

caves, and synanthropic habitats like old temples and unused houses¹¹. However, in this case we found that human presence in the cave temple as well as temple rituals like burning of camphor and ringing of bells did not disturb these bats (Figure 1). The cave temple is located in the Hogenakkal forest (11°57'44"N, 77°45'50"E; 272.7 m amsl), about 75 km from Salem. The height of the entrance of the cave temple is about 4 feet and one has to bend his/her head down to enter the temple. We performed an emergence count and observed that the colony consists of about 3050 bats.

This unusual roosting behaviour of *H. speoris* at the Muthaiyan cave temple



Figure 1. Schneider's leaf-nosed bat *Hipposideros speoris* roosting inside the Muthaiyan cave temple.



Figure 2. Roosting sites of *H. speoris* located in the surroundings of the cave temple roost. **a**, tunnel; **b**, under the bridges; **c**, **d**, unused old houses.

might be the result of a human-mediated sustained protection and comfort provided to these bats. According to a few elderly devotees, bats have been roosting at this cave temple for more than 90 years. Most importantly, bats are considered sacred here and are believed to be the messengers of the main deity, Lord Muthaiyan.

We also surveyed other roosting sites of *H. speoris* in the surroundings and located another ten roosts, all in synanthropic structures, including old houses, temples, underside of bridges, wells and tunnels (Figure 2). The population sizes of these roosts were comparatively

smaller than that of the cave temple and ranged from 30 to 200 bats. We also observed that bats in these roosts were sensitive to human presence, unlike the bats from the Muthaiyan cave temple. A detailed scientific study on the population dynamics of these bats in the cave temple and its vicinity might provide some insight into their fidelity to this particular roost.

It is quite well documented that traditional beliefs and worship practices augment biodiversity conservation by protecting the rich and diverse flora in the vicinity of places of worship like sacred groves¹². It seems that similar

beliefs also help in the protection of faunal diversity surrounding religious structures.

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