

Short Communications:

**EMERGING THREATS TO THE LARGEST COLONY OF BATS IN VIETNAM
AND RECOMMENDATIONS FOR SUSTAINABLE CONSERVATION**

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Among the thousands of known caves of Vietnam, Tan Lap Cave is home to the largest aggregation of bats in the country. At least six species (*Cynopterus sphinx*, *Rousettus leschenaulti*, *Myotis chinensis*, *Hipposideros pomona*, *Taphozous melanopogon*, and *Mops plicatus*) inhabit the cave seasonally or all year round (Vu Dinh Thong, 2014). An

estimated 3 million wrinkle-lipped free-tailed bats (*Mops plicatus*), (referred to as *Chaerephon plicatus* in previous publications), roost in the cave seasonally, from March to May and from August to October, making it the largest known colony of Vietnamese bats (Vu Dinh Thong, 2014; Simmons & Cirranello, 2020; Fig. 1).



Figure 1. *Mops plicatus* emerging from Tan Lap Cave [Photos by Christian Dietz and Vu Dinh Thong]

Tan Lap Cave is located in Lang Son province, northern Vietnam. Prior to 2007, it was only known by local people as an unnamed roosting site for "extremely large" bat colonies which supply many tons of guano annually (Fig. 2). Its features and the official name, "Tan Lap Cave", were first internationally documented by Christian Dietz and Vu Dinh Thong, respectively (fledermaus-dietz.de; batcon.org). Many local families have earned millions of Vietnamese Dong (VND) per month from selling the collected bat guano. Regrettably, the cave was not managed according to the IUCN guidelines for guano collectors (<https://portals.iucn.org/library/node/43412>).

People entered freely for guano collecting during the day and frequently hunted bats for food (Fig. 2). They regarded bat meat as a special food which is good for human health. Since 2012, local authorities decided to allow a local person, Mr. Nguyen Tat Thang, to manage the cave and he has installed a fence and gate at the cave entrance for prevention of bat hunting (Fig. 3). Therefore, bats of the cave were well conserved between 2012 and 2019. Unfortunately, since the COVID-19 pandemic with misleading information from the public media, which mentioned bats as the origin of SARS-CoV-2, local people have been confused and even questioned the bats' roles in natural ecosystems. Local bat hunters and many people, who believe that bat meat is good for their health, have taken this chance to continue hunting bats for food since April 2020. They have not been able to enter the cave but set up mist nets near the cave entrance for daily hunting (Fig. 3). Illegal trade of bat meat has thus arisen as an indirect but critical threat to bats of the Tan Lap Cave, which are currently critically threatened by hunting and illegal trade. We have conducted several trips to raise public awareness following the guidelines by the IUCN Bat Specialist Group (Nuñez et al., 2020). Everyone is required to wear facemask before entering the cave to avoid the possibility to transfer the SARS-CoV-2 from any infected person to bats. The facemasks were also delivered to the cave manager and other local

people who regularly enter the cave for collecting bat guano (Fig. 4). Our surveys between May and November 2020 indicated that dozens or hundreds of bats were hunted every night for the illegal trade which is valued at approximately 300,000 VND per kilogram. However, for sustainable conservation of bats and the Tan Lap Cave, the following solutions must be implemented as soon as possible:

Installation of security cameras to detect and record the hunters and hunting activities at the entrance and near by the cave.

Issue and implementation of strict regulations or local laws by district or provincial authorities for immediate and permanent cessation of bat hunting throughout at least the Huu Lung district or Lang Son Province.

Implementation of regular monitoring and ecological research to increase understanding of bat diversity and conservation status in the future.

Establishment of a monitoring team including a scientist and active local people and authorities to monitor the conservation status of bat species.

The Tan Lap cave and surroundings must be formally established as a Special Landscape and Species Protected Area in the future to avoid disturbance to the cave and bats.

Designation and promotion of fruit tree plantations around the cave to supply food to fruit bats inhabiting the cave.

Study of heavy metals, pollutants and pesticide residues in bats and their guano.

Prey analysis of the insectivorous species to calculate their ecosystem benefits, particularly control of crop pests.

Regular public awareness campaign in the context of the Covid-19 following the guidelines by the IUCN Bat Specialist Group for bat conservation and human health (IUCN SSC, 2014; Estrada et al., 2020; Nuñez et al., 2020).



Figure 2. Bat guano collecting (left) and hunting (right) by local people [Photos by Christian Dietz]



Figure 3. Fence installed at the cave entrance (left), a mistnet illegally set near the cave entrance (middle) and ca. 5 kilograms of bats hunted per night (right)



Figure 4. Vietnamese scientists from IEBR, NIHE and Japanese scientists in front of the cave gate together with local managers

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