Activity and migration behaviour of bats at Jungfraujoch – ongoing study

Peter E. Zingg[1], Fabio Bontadina[2,3]

[1] BRCC, Unterseen, Switzerland
[2] SWILD, Urban Ecology & Wildlife Research, Zürich, Switzerland
[3] Swiss Federal Research Institute WSL, Biodiversity and Conservation Biology, Birmensdorf, Switzerland

zinggpetere@gmail.com

Keywords: bats; bioacoustics; migration; high altitude; seasonal patterns

1. Project description

In Switzerland there are currently 30 species of bats, in mainland of western Europe more than 35. Eight of these species show seasonal migration behaviour, as we know it from birds.

Initial studies in autumn 2011 and spring 2012 showed that bats fly over the Jungfraujoch from the north in autumn and from the south in spring (Zingg & Bontadina 2016). At least in Europe, this is still the highest point at which a mountain range is crossed during seasonal migration of bats.

Usually it is only possible to catch bats with great effort in order to determine their species affiliation. When flying, bats orient themselves to short distances by means of echo imaging (echoperception) and use calls in the ultrasound range for this purpose. Thanks to hard- and software it is now possible under favourable circumstances to determine the species of a bat on the basis of its ultrasound calls. Instead of catching experiments, we therefore used a bioacoustic approach.

As in 2011/12, we used ultrasound data loggers of the Swiss company Elekon AG (www.batlogger.com) and the Batscope 3.2.0 software (www.batscope.ch, Boesch & Obrist 2013).

In 2018, the goal was to collect further acoustic data on flight activity, even in midsummer. In addition, we wanted to investigate at which 'locations' in the area of the Jungfraujoch bat calls can be recorded and at which sites no bats fly through.

Two to three ultrasound data loggers were used simultaneously for two to three nights at the end of April, May, June and July.

2. Results

In April ultrasound data loggers were operating simultaneously on the Plateau, the Sphinx and the Mönchsjoch during one night. In this experiment bat sounds were registered only on the plateau. As well as in a previous night, no bat calls could be recorded on the Sphinx, but on the plateau.

From May onwards, ultrasound data loggers were solely operating on the research station and the plateau. At both sites, bat calls could be recorded for at least one night during each of the two to three-day stays, except during the stay at the end of June.

Over the whole investigation period of 2018 a total of nine bat species could be acoustically identified.

Again, there was no evidence that bats would hunt insects in the air. Most probably the bats flying through showed all migration or dispersal behaviour.

3. Preliminary conclusions

Mönchsjoch (3620 m.a.s.l.) but also the Sphinx (3570 m.a.s.l.) are 150 m and 100 m higher opposite the research station (3470 m.a.s.l.) and the plateau (3465 m.a.s.l.). Obviously bats try to keep their energy consumption as low as possible and fly over the Jungfraujoch at the lowest point. Additional observation nights must further confirm this assumption.

At the end of June no bats could be detected on the Jungfraujoch. As far as is known, seasonal bat migration lasts until the month of May and starts again in August (end of July?) concerning certain bat species and populations. The lack of evidence of bats in June indicates that the Jungfraujoch is apparently only flown over in the course of migration. Further data collection nights in June and July also need to confirm this assumption.

References

Boesch, R. & Obrist M.K. 2013. BatScope - Implementation of a BioAcoustic Taxon Identification Tool. Swiss Federal Research Institute WSL, Birmensdorf, Switzerland. http://www.batscope.ch

Zingg, P.E., Bontadina, F. 2016. Migrating bats cross top of Europe. PeerJ Preprints 4:e2557v1 https://doi.org/10.7287/peerj.preprints.2557v1

Address

Bat research, conservation & consulting – BRCC
Spielhölzli 8
CH-3800 Unterseen, Switzerland

Contacts

Dr. Peter Zingg
Tel.: +41 33 823 0712 / e-mail: zinggpetere@gmail.com