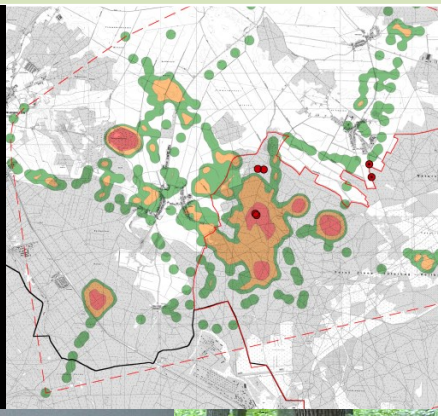
4th International Berlin Bat Meeting: Movement Ecology of Bats



Extended Abstract Booklet

Berlin, 13-15 March

2015

4th International Berlin Bat Meeting: Movement Ecology of Bats

Berlin, Germany, 13th – 15th of March 2015

Extended Abstract Booklet

Organised by

Leibniz Institute for Zoo and Wildlife Research (IZW)
Alfred-Kowalke-Straße 17
D-10315 Berlin
Germany

www.izw-berlin.de

CONTENTS

Poster: Movement and sociality of *Rhinolophus ferrumequinum* in October at a nursery roost and a hibernaculum in the U.K.

ANDREWS MARGARET M. [1], ANDREWS PETER T. [2], BEVIS SYLVIA M. [3], BILLINGTON GEOFF [4] and WILLS DAVID F. [3]

[1] School of Biomolecular Sciences Liverpool John Moores University, Byrom, Street, Liverpool L3 3AF; UNITED KINGDOMm.m.andrews@livjm.ac.uk
[2] deceased
[3] Devon Bat Group, Bat Conservation Trust, 250 Kennington Lane, London, SE11 5RD; UNITED KINGDOM
[4] Greena Ecology Consultancy, Frome, Somerset, BA11 5HH; UNITED KINGDOM

R. ferrumequinum were located at a nursery roost and a hibernaculum during October, when these bats mate in the U.K. At Stackpole, West Wales, *R. ferrumequinum* flying in and out of the nursery roost, were detected by infrared beam arrays mounted in the entrance/exit hole, together with automated computer systems installed nearby. Social behaviour inside the nursery roost was monitored using simultaneous infrared video and ultrasound recordings. Outside the nursery roost bat social behaviour was monitored with low light/infrared video records. Simultaneous ultrasound recordings, stored in a Sony ICD-MSI voice recorder, were coupled with the input from a speaking clock. Social behaviour was monitored in a cave at Chudleigh, Devon, which is a hibernaculum occupied predominantly by mature male *R. ferrumequinum* in October. Roosting bats were counted at midday at the beginning of 24 h automated ultrasound-recording sessions when the same ultrasound equipment was used as above. Ultrasound calls (x 32 time expansion) recorded with Tranquillity detectors (Courtpan) were analysed using BatSound (Pettersson), with a Hanning window and a FFT size of 512, and the ultrasound social calls were identified according to categories described by Andrews and Andrews (2003). The FM-CF-FM *R. ferrumequinum* echolocation calls (calls/h) were used to record the level of activity. Ultrasound social calls with fundamental frequencies in the range 11-39 kHz were identified at each location but complex frequency modulated oscillatory trill calls, with 5-7 components, were evident inside the cave in Devon (categories FM VII t, FM XIII t and FM XIV t). Inside the nursery roost less complex trills calls were identified with 2-4 components (categories FM IV t, FM V t, FM VI t) as well as the trill calls with 5-7 components. The ratio of 2-4:5-7 component calls inside the roost was 3.8:1. Outside the roost only the less complex 2-4 component trill calls were recorded. The predominance of the more complex 5-7 component trill calls in the cave in male *R. ferrumequinum* territory indicates that these bats make calls that have sufficient variety to identify individuals at a distance. However, the oscillatory trill calls inside the nursery roost suggest that some mating activity also occurs in predominantly female *R. ferrumequinum* territory and that social behaviour outside the nursery roost in October is not 'light sampling' but has a specific purpose related to mating.
Reference: Andrews, M. M. & Andrews, P. T. (2003). *Acta Chir.*, 5 (2): 221-234.

Poster: Acoustic activity measured at wind turbines reflects the autumn migration of bats in central Europe

BEHR OLIVER[1], HOCHRADEL KLAUS[1], MAGES JÜRGEN[1], NAGY MARTINA[1]; KORNER-NIEVERGELT FRÄNZI[4], NIERMANN IVO[3], SIMON RALPH[1], WEBER NATALIE[1], BRINKMANN ROBERT[2]

[1] Friedrich-Alexander-University Erlangen-Nuremberg, Department of Sensor Technology, Paul-Gordan-Str. 3-5, D-91052 Erlangen, GERMANY; oli.behr@fau.de
[2]Freiburg Institut of Applied Animal Ecology (FrInaT) GmbH, Freiburg, GERMANY
[3]Leibniz University Hannover, Institute of Environmental Planning, Hannover, GERMANY
[4]oikostat GmbH, Ettiswil; SWITZERLAND

Most of the current ideas on bat migration in Europe are based on banded individuals. Hence, the general direction and the distance of migration movements are known to some extent. There is, however, very little information on travelling speed and the routes used during migration. We continuously measured the acoustic bat activity at the nacelle (about 65 to 90 m above ground level) of 70 randomly selected wind turbines in 35 facilities in five different habitat types in Germany from May to October 2008 using 'batcorder' detectors suited for automatic sampling. 16 of these turbines were resampled from July to September of 2012 with 'batcorder' and 'Avisoft' detectors. Additionally, the area under the turbines was searched daily for animal fatalities between July and September at 30 of the turbines of the 2008 data-set and under all turbines sampled in 2012.
One short-distance (*Pipistrellus pipistrellus*) and three long-distance (*Nyctalus noctula*, *N. leisleri*, and *P. nathusii*) migrating species accounted for almost the entire activity recorded. All species showed large differences in acoustic activity both, within and between consecutive nights as well as between different months. Activity generally peaked in August. There were, however, species-specific differences with high activity also recorded in July or September. Acoustic activity patterns resulted in corresponding fatality numbers. The timing of the activity peaks measured suggests they were at least partly caused by migration behaviour.
Seasonal differences were most evident in *P. nathusii*, a species not commonly found in the sample area during summer. This species showed a marked activity peak for one to two weeks in late summer during the migration period. The first peak was recorded in mid-August in north-eastern Germany, subsequently shifting southwest to other areas sampled. The latest peak we found was in mid-western Germany around mid-September. Thus, the timing of the activity peaks recorded is likely to reflect the movement of the main migration activity along the migration route from north-eastern to south-western Europe. Our results suggest that acoustic activity data obtained at wind turbines might provide valuable insights into migration behaviour of bats.

Poster: Hunting high and low: Bat foraging and migration and its implications for wind power

BLOMBERG ANNA[1], LILLEY THOMAS[2], NORRDAHL KAI[1] AND VASKO VILLE[1]

[1]University of Turku, Department of Biology, 20014 Turku, FINLAND; asblom@utu.fi
[2]Bucknell University, Biology department, PA 17837, USA

Wind power development is currently booming in Finland. Despite the growing interest towards bat fatalities associated with wind power, there is currently not enough information to assess the potential risks to Finnish bat populations. We conducted our study during 2013 and 2014 on the island of Kemiö in South-Western Finland where there are plans to build more than a hundred wind turbines. The aim of our study was to investigate the species composition and timing of migration. Furthermore we investigated which species are most susceptible to wind power and pinpointed the time period during which they are most active at high altitudes. We studied both migrating and foraging bats on ground level and at a height of 60 meters on 10 GSM-masts using acoustic monitoring. We found that most of the migratory species occurred close to the shore line during a period of only a few weeks at the end of August and the beginning of September. The most abundant migratory species on the island was the Nathusius' pipistrelle (*Pipistrellus nathusii*), which was often observed at 60 meter height. Other migratory species observed were the common pipistrelle (*Pipistrellus pipistrellus*), the noctule bat (*Nyctalus noctula*) and the particoloured bat (*Vespertilio murinus*). However, according to our results the most vulnerable species in Finland could be the northern bat (*Eptesicus nilssonii*) as it was regularly foraging at 60 meters and was particularly abundant during an activity peak at the end of June. The northern bat is by far the most common bat species in Finland and while for other bat species Finland represents the fringe of their distribution, the northern bat is extremely well adapted for the harsh conditions in Finland. Often bat activity at higher altitudes was not observed from the ground level, which highlights the need for acoustic monitoring above the canopy when determining if a location is suitable for wind power.

Poster: Quantifying the effects of habitat fragmentation: conservation implications for an isolated population of a sedentary species

DOOL E. SERENA[1,2], PUECHMAILLE J. SEBASTIEN[1,2], TEELING C. EMMA[1]

[1]University College Dublin, School of Biology and Environmental Sciences, Belfield, Dublin 4, IRELAND.
[2]Ernst-Moritz-Arndt-Universität Greifswald, Zoologisches Institut und Museum, Johann-Sebastian-Bach Str.11/12, D-17487, Greifswald, GERMANY.
emma.teeling@ucd.ie

Numerous radio-tracking and bat-banding studies have shown *Rhinolophus hipposideros* to be a highly sedentary species, typically foraging within a few kilometres of its roost with low overall lifetime dispersal distances. This species is associated with woodland habitats and its flight-style is adapted for high manoeuvrability among cluttered vegetation. Long-distance movements and flight across open habitats are rare. Additionally, like many temperate bat species, females of this species exhibit strong natal philopatry. As a consequence of such ecological characteristics, this species is highly susceptible to anthropogenic changes to the landscape.
In the current study we examine an isolated population of this sedentary species which is also the least genetically diverse population of *R. hipposideros* known. We chose this population in Ireland due to its known demographic history: it recolonized the island within the past thousands of years at a time when it was covered in oak woodlands. Human-mediated deforestation began circa 6,000 years ago and continued until very recently, drastically reducing the woodland cover to 1.5%.
We use mitochondrial DNA sequences (1629bp) and 11 microsatellite loci in a landscape genetic approach. We calculate the isolation-by-resistance (IBR) metric based on circuit theory to determine the cost of all possible pathways connecting colony pairs for our study population. We show that areas of low habitat suitability are reducing genetic connectivity between colonies in this population, and are effectively bisecting its range.
Our results can be used to support conservation planning for this species across its distributional range and more specifically to enable targeted connectivity improvements for this species within this studied population.

Poster: The shortest way over the sea – a new migration route between Finland and Sweden for Nathusius' pipistrelles

FRITZÉN NICLAS R.[1], HAGNER-WAHLSTEN NINA[2], KYHERÖINEN EEVA-MARIA[3]

[1]Valsörarna biological station, Klemetsögatan 7 B7, 65100 Vasa, FINLAND, nrfritzen@gmail.com
[2]BatHouse, Trädgårdsvägen 6, 02700 Grankulla, FINLAND
[3]Finnish Museum of Natural History LUOMUS, University of Helsinki, P.O.Box 17, 00014 University of Helsinki, FINLAND

The prevailing view has been that the migration of the Nathusius' pipistrelle (*Pipistrellus nathusii*) in Finland occurs in the southernmost parts of the country only. In 2010 the first Nathusius' pipistrelles were discovered much further north at a latitude of 63°N in Ostrobothnia on the west coast of Finland. Since then it has regularly been recorded in surveys related to wind farm planning in this area, but almost exclusively during its autumn migration period. The species is still not known to breed in this area. In 2013 a project named KvarkenBats was initiated to study bat migration in this coastal area using ultrasonic monitoring. The focus was particularly on the Kvarken Archipelago, with the hypothesis that Nathusius' pipistrelles migrate through Kvarken at its narrowest point over the sea between Finland and Sweden. From here the bats are supposed to continue their flight to the hibernation sites in Central Europe. The results from the first year of study were very intriguing. On the Valsörarna islands in the outermost archipelago on the Finnish side, numerous recordings of the Nathusius' pipistrelle were made during a three week period from late August to early September by the three AnaBat detectors used. In 2014 the project was extended to cover the Holmöarna islands on the Swedish coast only 25 kilometres from the Valsörarna islands. The study thus covered the most remote islands of either side of Kvarken, at the point where the flight route would be at its shortest between the countries. This year migration did not start until the beginning of September, but it occurred on the Holmöarna islands too and it was synchronised between the two islands. The results from these two years support the hypothesis of a previously unknown northern migration route of the Nathusius' pipistrelle between Finland and Sweden. However, the direction of the migration and the locations of the breeding areas of the migrating bats are still unknown. These are questions to be answered in the forthcoming years.

Poster: Stable Isotope Analysis of Nathusius' Pipistrelle Fur Samples in the UK

GRANT LAURA, SHEPHERD PETER, GABB OWAIN, VOIGT, CHRISTIAN

BSG Ecology, Worton Rectory Park, Witney, Oxford, OX29 4SX, ENGLAND;
L.Grant@bsg-ecology.com

The extent of bat migration between continental Europe and the United Kingdom (UK) is poorly understood. In 2012 BSG Ecology deployed a bat detector at Dungeness (south-east England coast) to establish whether pulses of bat activity indicative of migration could be detected there. The detector was deployed between April and October 2012 inclusive and the report was published in March 2013 (BSG, 2013a).
The highest levels of Nathusius' pipistrelle *Pipistrellus nathusii* activity were recorded within the known migratory periods of bats in mainland Europe; May and September. In 2013 the pilot study was expanded by:
a. continuing the survey at Dungeness to establish whether this pattern is repeated in successive years;
b. surveying at further east coast locations to identify whether this pattern is also shown at other locations (possibly indicating broad front movement); and
c. collecting fur samples of Nathusius' pipistrelle to conduct stable isotope analysis.
In 2013 we published the Kent Bat Migration Research; Baseline Report (BSG, 2013b). However, the stable isotope results were not included as analysis of the fur samples and interpretation of the results had not been completed.
Altogether 25 samples were obtained from a range of sources including bat box checks, mist netting, harp traps, grounded bats and dead animals. The stable hydrogen isotope ratios (δ^2H) of the hair samples were analysed by Christian Voigt at the Leibniz Institute for Zoo and Wildlife Research, Berlin, Germany.
It is acknowledged that there can be local variation in δ^2H of precipitation (δ^2Hp) within a given area (C. Voigt pers. comm.). However, the δ^2Hp of samples ranged between -9.2 and +14.1 of the known δ^2Hp of the location in which the bats were recovered. This variation is substantial and is an indication that another parameter is responsible for the variance. In this case, the data strongly suggest that a proportion of the bats sampled were migratory. These findings tie in with the current evidence in support of Nathusius' pipistrelle migration.

References:
BSG Ecology (2013a) Dungeness, Kent; Bat Migration Pilot Study. Oxford, 18 March 2013. Ref: 2012-R-LJ-OG2-SB 20130318
BSG Ecology (2013b) Kent Bat Migration Research; Baseline Report. Oxford, 12 December 2013. Ref: Kent Bat Migration Research Baseline Report__12122013

Poster: Object Memory vs. Spatial Memory in Trawling Bats, *Myotis daubentonii*

AASKOVEN NICOLAJ L., LARSEN EMIL G., SURLYKKE ANNEMARIE

University of Southern Denmark, SDU, Department of Biology, Odense DK-5230 Odense M. DENMARK. ams@biology.sdu.dk

Bats have a well developed spatial memory. They remember feeding places or position of obstacles in their flight ways. They also make use of landmarks for orientation and navigation and remember object attributes [1]. Results have shown the nectar feeding bats rely mostly on position [2], whereas gleaning bats use object memory to find food reward [3], indicating that importance of object vs. spatial memory may rely on hunting strategy.
We trained nine trawling vespertilionid bat *Myotis daubentonii* to a fly to a food reward presented at one of two very distinct shapes functioning as feedingplatforms. We tracked their flight behavior by infrared videorecording. We recorded their echolocation calls by an array of seven ¼" precision microphones and we determined their sonar beam aim by an array of 64 microphones behind the shapes, connected directly to diodes.
After having learned to fly to the rewarded place and shape with > 90% success we switched the position of the two shapes. In the first trial after the move seven of the nine bats flew to the trained position and only two flew to the shape. The sonar beam was directed toward the trained position. When the whole scene was moved (shapes and surrounding objects) the bats flew to the trained *relative* position.
The results show trawling *Myotis daubentonii* presented with conflicting sensory information rely more on spatial memory than on object recognition. Gleaning bats may rely more on shape to recognize their prey in different locations, whereas nectar feeding bats may need to remember the position of food plants. Thus the results call for more data to show if prominence of memory can be predicted by hunting strategy in bats.

[1] Griffin, D.R. (1958) Listening in the dark. New York: Yale Univ. Press, 2.ed 1986 Cornell University.
[2] Thiele, J., Winter, Y. (2005) Hierarchical strategy for relocating food targets in flower bats: spatial memory versus cue-directed search. Anim. Behav. 69: 315-327
[3] Hulgard, K., Ratcliffe, J.M. (2014) Niche-specific cognitive strategies: object memory interferes with spatial memory in the predatory bat, *Myotis nattereri*. J. exp. Biol.

Poster: Bat diversity, activity and migration patterns in forested low mountain ranges in Germany

HÖHNE ELENA, WEITZEL MONA, DIETZ, MARKUS

Institute of Animal Ecology and Nature Education, Altes Forsthaus, Hauptstraße 30, D-35321 Gonterskirchen, GERMANY; Elena.Hoehne@tieroekologie.com

Since a couple of years in Germany the installing of windpower is spreading out into low mountains in middle and south-western Germany with lesser wind speeds compared to coastal regions. Most of the windfarms are projected in low mountains covered with deciduous or coniferous forests. For bats forests provide both roosting and foraging sites of high quality. It is crucial that most woodlands in central Germany are not only be important for local but also for migrating populations. In the course of several windfarm projects we investigated bat activity at 18 locations distributed in central and south-western Germany. Beside mist-netting and radio-tracking we used stationary ultrasonic bat detectors (Batcorders of the company EcoObs, Germany) for long time monitoring from beginning of April until the end of October/beginning of November. The real-call recordings of bat calls were determined and grouped in three bat call types, the *Pipistrellus*-group (bats of genus *Pipistrellus*), the *Myotis*-group (bats of genus *Myotis*, *Plecotus* and *Barbastella*) and the *Nyctaloide* group (bats of genus *Nyctalus*, *Eptesicus* and *Vespertilio*). Furthermore, manual software based sound analyses were done to allocate the calls to different bat species. By comparing the activity of the groups between time and locations we show the phenology of the bats in the different regions and review the influence of the landscape and climate at the bat activity. At the end we discuss the results related to bat migration and wind power extension in forested low mountains.

Poster: Diet of the insectivorous bat Pipistrellus nathusii during autumn migration and summer residence

KRÜGER FRAUKE[1], CLARE ELISABETH L. [2], SYMONDSON WILLIAM[3], KEISS OSKARS[4], PETERSONS GUNARS[5]

[1] Echolot GbR / Institute of Natural Resource Conservation, University of Kiel, GERMANY
[2] School of Biological and Chemical Sciences Queen Mary, University of London, UNITED KINGDOM
[3] Cardiff School of Biosciences, Cardiff University, UNITED KINGDOM
[4] Institute of Biology, Laboratory of Ornithology, University of Latvia, LATVIA
[5] Faculty of Veterinary Medicine, Latvia University of Agriculture, LATVIA

Migration is a well known phenomenon in vertebrates. Yet bats have received little attention and only in the recent decades knowledge has been gained. It is known, that migration can cause significant changes in behaviour and physiology, due to changing energy demands. Dietary shifts for examples have been shown to occur in birds before onset of migration. For bats it is not known if a change in diet occurs during migration, although especially breeding season related dietary preference have been documented. Also it is known that fat rich diets and thus high fat deposits do increase the flight range of migratory bats. Within the bats some species can be regarded as long-distance migrants, covering up to 2,000 km on their way between summer and winter roosting areas. Pipistrellus nathusii (Vespertilionidae), a European long-distant migrant travels each year along the Baltic Sea from north-eastern Europe to hibernate in central and southern Europe. This study presents data on the dietary habits of migrating Pipistrellus nathusii in relation to the dietary habits during the breeding season. We analysed samples from bats on fall migration caught at the Ornithological Field Station in Pape, Latvia and from samples collected in summer roosts. We applied both morphological identification and molecular analysis to study the diet. Diets between the groups of bats on migration and breeding bats were rather similar. Diptera and Lepidotpera are as well as during breeding as during migration the major prey groups. However certain prey groups could be assigned to the different hunting habitats used during migration vs. summer residence.

Poster: *Ametrida centurio*: small bat, big traveller?

ACÁCIO MARTA[1], ROCHA RICARDO[1,2], BERNARD ENRICO[3], LÓPEZ-BAUCELLS ADRIÀ[1,4]

[1] Centre for Ecology, Evolution and Environmental Changes, Faculty of Sciences of the University of Lisbon, 1749-016 Campo Grande, Lisboa, PORTUGAL; adria.baucells@gmail.com
[2] Metapopulation Research Group, Department of Biosciences, P.O. Box 65, 00014 University of Helsinki, FINLAND
[3] Laboratório de Ciência Aplicada à Conservação da Biodiversidade Departamento de Zoologia, Universidade Federal de Pernambuco Rua Nelson Chaves s/n, Cidade Universitária - Recife PE 50670-901 BRASIL
[4] Museu de Ciències Naturals de Granollers, Palaudàries, 102. Jardins Antoni Jonch Cuspinera – 08402 Granollers, SPAIN

Bat migration is still one of the most enigmatic natural phenomena. Due to their small size and cryptic habits, studying bat movements can be a challenging task. Many bat species have been described as regional migrants, travelling just a few hundred kilometres, but other species, the long-distance migrants, can travel over one thousand kilometres. However, most of the knowledge of bat movements is regarding European and North American bats and apart of some northern species, there is virtually no evidence of migratory bats in the neotropics.
The white-shouldered bat (*Ametrida centurio*) is the smallest member of the Phyllostomidae family. This is a rare species that has been recorded in South America, from Venezuela to Brazil, but there is essentially no information about its feeding habits or habitat requirements. In this study we reveal an unequal time occurrence of this species in the same area, which can possibly represent the first evidence of a migratory movement of the white-shouldered bat in the Central Amazon, Brazil. Throughout four years of intensive mist-netting effort (20,214.86 m^2h in total) in two locations 600 km apart in Central Amazon, despite making a similar capture effort during the whole year we captured 84 individuals of this species, 55 of which were caught during the period from September to November, showing a peak on its capture rate.
This preliminary data could represent a regional migratory movement of the white-shouldered bat. Nevertheless, more research is needed to understand the extent of this movement. There have been studies associating migratory movements of bats with plant phenology, connecting bat abundance with fruit availability. On the other hand, in *terra-firme* non-flooded forests, this difference in abundance can be the result of a vertical migratory movement, from above the canopy to lower altitudes, where they can be captured by mist-netting. Further studies are needed to better understand the movements of the white-shouldered bat. Techniques such as the stable isotopes could provide critical information to understand the ecology of this rare species and ultimately contribute to its conservation.

Poster: Buzz II vary in duration accordingly to the level of difficulty when catching prey, in the bat *Myotis daubentonii*

HULGARD KATRINE, PEDERSEN RANDI, SURLYKKE ANNEMARIE, RATCLIFFE M. JOHN.

University of Southern Denmark, Scientific Faculty, Dept. of Biology, Campusvej 55,5230, Odense M, DENMARK; khulgard@biology.sdu.dk

Myotis daubentonii is an echolocating vespertilionid bat that prefers to hunt over water by trawling, but occasionally hawk for prey in open areas. The hunting behavior of *M. daubentonii* consists of four stages; namely the search phase, approach phase and a terminal phase divided into a buzz I and buzz II. During the buzz the repetition rate increases rapidly up to around 200 Hz and the call frequency decreases by approximately an octave to terminate around 20 kHz. The duration of this buzz II phase is very flexible and can vary considerably.
We tested the hypothesis that the duration of the buzz II would change according to the degree of difficulty in the task, assuming that a moving prey is more difficult than a stationary prey, and that catching prey from mid-air is more difficult for *M. daubentonii* than catching prey from the water surface.
In the lab, three *M. daubentonii* were trained to take prey from the water surface in a small pond, and also from a string hung from the ceiling. The prey could be still or it could be rotated in a steady pace – either on the water surface or in midair. The bats' acoustic behavior was recorded with a multi-microphone array with 4 ¼'' G.R.A.S. microphones, and the sound files analyzed afterwards.
We found that the length of the buzz II phase did indeed vary considerately between tasks ranging from 31,2ms to 370,1ms. The shortest buzzes were for stationary prey on the water, whereas moving prey in air resulted in the longest average buzz-duration. Evasive prey is harder to catch than still prey, and must presumably be pursued more closely for a longer period of time. Based on our results we propose that buzz duration could be a proxy for the degree of difficulty for a given task. If so, catching prey on a water surface, even when moving, is easier for the bats than catching still prey in mid-air. The easiest task was to catch still prey on the water surface, whereas the hardest task was catching moving prey in mid-air.

Poster: Echolocation behaviour and foraging by the Bare-rumped sheathtail bat *Saccolaimus saccolaimus* in Australia

RICHARD MEUTSTEGE[1], ROGER COLES[2] & HUGH SPENCER[1]

[1]Cape Tribulation Tropical Research Station, Cape Tribulation, Queensland, AUSTRALIA 4873; r_meut@hotmail.com; hugh@austrop.org.au

[2]School of Biomedical Sciences, The University of Queensland, Brisbane, Queensland, AUSTRALIA 4072; r.coles@uq.edu.au

The presence of the Bare-rumped sheathtail bat (*Saccolaimus saccolaimus*) in Australia is extralimital to the core distribution throughout south east Asia and south Asia. It is considered to be Critically Endangered in Australia although the lifestyle of *S. saccolaimus* has remained largely a mystery until recently due to very few identified (tree) roosts or collected specimens. It has never been captured alive whilst foraging, typically hunting in very open spaces and often at high altitudes. However a distinctive two note frequency alternating echolocation call has been discovered (Coles et al. *Australasian Bat Society Newsletter* 2012 **38**:35-36) typically in the form of triplet and doublet patterns for populations in both Australia and south east Asia. Given the difficulty in using echolocation calls to positively identify other sympatric emballonurid species in Australia that use the 20-26kHz main harmonic frequency band, this unusual calling pattern was used to detect and identify *S. saccolaimus* foraging at night. In this study which was conducted at field sites in the Daintree-Cape Tribulation region of north Queensland, it has been possible for the first time, to observe acoustically (and visually) *S. saccolaimus* commuting and foraging. A defined roosting area was found in lowland dipterocarp rainforest, near the top of a ridge (150m asl) and within 1km of the coastline. It has been possible to track the movements of several individuals (identified by echolocation call patterning) from this roosting area and they were found to fly along a narrow coastal strip at Cape Tribulation - typically foraging just above canopy height and for a 2km length of mangrove and littoral forest immediately adjacent to the beach. Another 10 foraging locations have been identified between Cape Tribulation and the Daintree River, and up to 15km inland. Extensive ultrasound recordings, including the use of a lightweight full spectrum bat detector (*Nanobat*) on a pole placed above canopy height in the middle of the foraging area, have allowed a detailed examination the calling behaviour of this species. All phases of search, approach and the capture of prey by echolocation have been studied. A number of social calls have been identified, notably a strange flight 'song' of unknown function recorded from foraging individuals and sometimes paired.

Poster: Change in Bat Species Abundance at Cave Park Grabovača throughout the Season

PUŠIĆ ANA[1], ROŽMANIĆ CARMEN[1], MERKLER MIRNA[1], KRAJNOVIĆ MARIJA[1], JOVANOVIĆ ANA[1], POSTIĆ SANDRA[1], HAMIDOVIČ DANIELA[2]

[1] BIUS - Biology Students Association, Rooseveltov trg 6, 10000 Zagreb, CROATIA; ana.pusic9@gmail.com
[2] State Institute for Nature Protection, Trg Mažuranića 5, 10000 Zagreb, CROATIA

Cave Park Grabovača is located in Lika, on the southern slope of the Velebit mountain. As its name says, it has a large number of caves located in a small area surrounded by oak and beech forests and cultivated areas with the river Lika and lake Krušćica close by making it a very suitable habitat for numerous bat species. The study was conducted in May and August 2014 for a week as a part of an international inventory project "Grabovača 2014" organised by BIUS – Biology Students Organisation with the aim of establishing whether there is a change in species composition and if there is which part of the season suits them better. In May there were seven underground sites visited, and at three out of the seven mist nets were put up for capturing bats at cave entrances. In August the three previous mistnetting sites were re-visited with one new location. In total 9 species were caught (*Rhinolophus hipposideros, Rh. ferrumequinum, Myotis mystacinus/aurascens, M. alcathoe, M. myotis, M. capaccinii, M. nattereri, Plecotus kolombatovici, Pl. auritus)* with 8 species (*Rh. hipposideros, Rh. ferrumequinum, M. mystacinus/aurascens, M. alcathoe, M. myotis, M. capaccinii, Pl. kolombatovici, Pl. auritus*) caught in May and 4 species caugt in August (*M. nattereri, Pl. kolombatovici, Rh. hipposideros, Rh. ferumequinum).*Due to uncharacteristic weather condition during the entire year and relatively short field research the results may not be showing the usual state of bat fauna in the area so it would be best if the research was extended to a couple more years and with more visits to the sites per season.

Poster: High altitude records of bats in Salzburg (Austria)

WIDERIN KARIN, JERABEK MARIA

Koordinationsstelle für Fledermausschutz und –forschung in Österreich (KFFÖ), Fritz-Störk Straße 13, 4060 Leonding, AUSTRIA;
karin.widerin@fledermausschutz.at, maria.jerabek@fledermausschutz.at

Little is known about the occurrence of bats at high altitudes in the Austrian Alps. Here we present records of bats from five high altitude locations in the National Park Hohe Tauern: Kalser Törl, 2,518 m above sea level (msm), Tauernkogel, 2,598 msm, Medelzscharte, 2,650 msm, Medelzkopf, 2,761 msm (all Uttendorf, Stubachtal), and Hoher Sonnblick, 3,106 msm (Rauris).

The following methods were used: Mistnetting at Kalser Törl on the 16th of August 2013, recordings with an automated bat detector system ("batcorder", ecoObs, Nuremberg) at Kalser Törl (31.7.2013, 11.8.2013, 15.8.2013, 16.8.2013), Tauernkogel (30.8.2013), Medelzkopf (6.8.2014) and Sonnblick (continuous recording from 19.8.2014-17.9.2014) as well as recordings with a time-expansion bat detector (Petterson D240x) at Kalser Törl and Medelzscharte.

Four species of bats were caught during mistnetting at Kalser Törl (Nyctalus noctula, Vespertilio murinus, Eptesicus nilssonii, Plecotus auritus), and three further bat species were recorded by the batcorder system at the same site (Pipistrellus pipistrellus, Nyctalus leisleri, Myotis sp.). Further, we detected Eptesicus nilssonii, Vespertilio murinus and Pipistrellus nathusii/kuhlii and probably Nyctalus leisleri at Tauernkogel, Eptesicus nilssonii, Vespertilio murinus and Nyctaloide (possibly Nyctalus leisleri) at Medelzscharte, and Vespertilio murinus and Eptesicus nilssonii at Medelzkopf. Even at the highest location, Sonnblick, we detected six bat species or species groups (Pipistrellus nathusii/kuhlii, Vespertilio murinus, Eptesicus nilssonii, Nyctaloide, Pipistrellus pipistrellus and possibly Plecotus sp.) despite the fact that the weather was wetter and colder than normal during August/September 2014.

We discuss the results in relation to resident versus migratory status of bat species and in relation to weather conditions at these high elevation places.