

Reporting Summary

Nature Portfolio wishes to improve the reproducibility of the work that we publish. This form provides structure for consistency and transparency in reporting. For further information on Nature Portfolio policies, see our [Editorial Policies](#) and the [Editorial Policy Checklist](#).

Statistics

For all statistical analyses, confirm that the following items are present in the figure legend, table legend, main text, or Methods section.

n/a Confirmed

- ☐ ☒ The exact sample size (n) for each experimental group/condition, given as a discrete number and unit of measurement
- ☐ ☒ A statement on whether measurements were taken from distinct samples or whether the same sample was measured repeatedly
- ☐ ☒ The statistical test(s) used AND whether they are one- or two-sided
Only common tests should be described solely by name; describe more complex techniques in the Methods section.
- ☐ ☒ A description of all covariates tested
- ☐ ☒ A description of any assumptions or corrections, such as tests of normality and adjustment for multiple comparisons
- ☐ ☒ A full description of the statistical parameters including central tendency (e.g. means) or other basic estimates (e.g. regression coefficient) AND variation (e.g. standard deviation) or associated estimates of uncertainty (e.g. confidence intervals)
- ☐ ☒ For null hypothesis testing, the test statistic (e.g. F , t , r) with confidence intervals, effect sizes, degrees of freedom and P value noted
Give P values as exact values whenever suitable.
- ☐ ☒ For Bayesian analysis, information on the choice of priors and Markov chain Monte Carlo settings
- ☒ ☐ For hierarchical and complex designs, identification of the appropriate level for tests and full reporting of outcomes
- ☐ ☒ Estimates of effect sizes (e.g. Cohen's d , Pearson's r), indicating how they were calculated

Our web collection on [statistics for biologists](#) contains articles on many of the points above.

Software and code

Policy information about [availability of computer code](#)

Data collection To collect the data, we used the software R. All code is available in the figshare repository (DOI: 10.6084/m9.figshare.27079759)

Data analysis To analyse the data, we also used R. All code is available in the figshare repository (DOI: 10.6084/m9.figshare.27079759)

For manuscripts utilizing custom algorithms or software that are central to the research but not yet described in published literature, software must be made available to editors and reviewers. We strongly encourage code deposition in a community repository (e.g. GitHub). See the Nature Portfolio [guidelines for submitting code & software](#) for further information.

Data

Policy information about [availability of data](#)

All manuscripts must include a [data availability statement](#). This statement should provide the following information, where applicable:

- Accession codes, unique identifiers, or web links for publicly available datasets
- A description of any restrictions on data availability
- For clinical datasets or third party data, please ensure that the statement adheres to our [policy](#)

The code and data required for the analysis are provided in the Figshare data repository (DOI:10.6084/m9.figshare.27079759)

Research involving human participants, their data, or biological material

Policy information about studies with [human participants or human data](#). See also policy information about [sex, gender \(identity/presentation\), and sexual orientation](#) and [race, ethnicity and racism](#).

Reporting on sex and gender	NA
Reporting on race, ethnicity, or other socially relevant groupings	NA
Population characteristics	NA
Recruitment	NA
Ethics oversight	NA

Note that full information on the approval of the study protocol must also be provided in the manuscript.

Field-specific reporting

Please select the one below that is the best fit for your research. If you are not sure, read the appropriate sections before making your selection.

☐ Life sciences ☐ Behavioural & social sciences ☒ Ecological, evolutionary & environmental sciences

For a reference copy of the document with all sections, see [nature.com/documents/nr-reporting-summary-flat.pdf](https://www.nature.com/documents/nr-reporting-summary-flat.pdf)

Ecological, evolutionary & environmental sciences study design

All studies must disclose on these points even when the disclosure is negative.

Study description	We investigated niche partitioning of two bat species by analysing their spatio-temporal habitat selection. We tracked bats using a high-throughput automated tracking system, which allowed us to study up to eight individuals simultaneously. We calculated temporal explicit habitat selection ratios by dividing the land cover proportions within 50% utilisation distributions of 30 minute time intervals by land cover proportions of 95% utilisation distributions of each individual. For the niche axis resource use, we applied metabarcoding of guano of 30 bats.
Research sample	We analysed the habitat selection of 34 <i>Pipistrellus kuhlii</i> (nine males, 25 females) and 24 <i>Pipistrellus nathusii</i> (23 males, one female). The observed sex ratios align with typical patterns reported for Central European populations. All animals were adults. Sample choice was based on capture success and available transmitters.
Sampling strategy	We only tagged adult bats without physical restraints. Since there are no estimates on the population sizes available, we cannot estimate the proportion of the populations we sampled. However, we captured 153 <i>P. kuhlii</i> and 135 <i>P. nathusii</i> and analysed the habitat selection of 34 and 24 individuals, respectively, meaning we sampled 22% of available <i>P. kuhlii</i> and 16 % of available <i>P. nathusii</i> . Thus, we are confident that our sample size is a robust subset of the local populations.
Data collection	Tracking data were automatically recorded by the automated radio telemetry system we used. Daytime roosts were manually searched using the homing in method. The guano for the metabarcoding analyses was collected immediately after capturing the bats.
Timing and spatial scale	We collected data from June to early September 2022 and 2023. During this period, bats raise their pups and start to mate (late August). Thus, this period represents the most energy-demanding time of a bat's year. We tracked up to eight individuals simultaneously, depending on the capture success. Tracking duration ranged from a minimum of one night to nine consecutive nights per bat. After that, transmitters fell off the animals.
Data exclusions	We included 58 of 91 tracked individuals in the analyses. Animals without daytime roosts and models that failed to converge because they did not stay long enough in the study area were excluded from the analyses. Due to financial restrictions, 30 instead of 58 guano samples were metabarcoded.
Reproducibility	We used an open-access radio tracking system to study animal movement. The results can easily be reproduced using this system, and we provide all the data and code for reproducing the study.
Randomization	This is irrelevant in our study because the animals were chosen based on capture success, which we could not influence.
Blinding	Blinding was not possible, because we had to identify the animals before tagging them.
Did the study involve field work?	☒ Yes ☐ No

Field work, collection and transport

Field conditions	The study area's climate is humid continental (Köppen classification), with an average annual temperature of 12 °C and annual precipitation of 458 mm. During our study period, weather conditions such as temperature (median: 20.1 °C, IQR: 18.3-21.9 °C), wind speed (median: 2 m·s ⁻¹ , IQR: 1.3-3.1 m·s ⁻¹), and precipitation (median: 0 mm, IQR: 0-0.02 mm) were stable.
Location	We conducted our study in the Seewinkel region, located on the eastern shore of Lake Neusiedl in eastern Austria (47°44'N, 16°46'E, 119 m a.s.l.).
Access & import/export	All animal experiments were conducted with permits from the Austrian Ministry of Education, Science and Research (2022-0.137.202) and the local administration of Land Burgenland (A4/NR.AB-10122-5-2022).
Disturbance	We used an automated radio tracking system to minimise disturbance to the study area. Thus, we did not have to follow the bats on foot, which would cause significant disturbance.

Reporting for specific materials, systems and methods

We require information from authors about some types of materials, experimental systems and methods used in many studies. Here, indicate whether each material, system or method listed is relevant to your study. If you are not sure if a list item applies to your research, read the appropriate section before selecting a response.

Materials & experimental systems

n/a	Involved in the study
☒	☐ Antibodies
☒	☐ Eukaryotic cell lines
☒	☐ Palaeontology and archaeology
☐	☒ Animals and other organisms
☒	☐ Clinical data
☒	☐ Dual use research of concern
☒	☐ Plants

Methods

n/a	Involved in the study
☒	☐ ChIP-seq
☒	☐ Flow cytometry
☒	☐ MRI-based neuroimaging

Animals and other research organisms

Policy information about [studies involving animals](#); [ARRIVE guidelines](#) recommended for reporting animal research, and [Sex and Gender in Research](#)

Laboratory animals	NA
Wild animals	We captured bats using hair and monofilament nets at 21 sites, including wooded and settlement areas. The nets were continuously monitored from sunset to midnight or midnight to dawn. We identified bats at the species level following the identification criteria outlined in Dietz and Kiefer. For every bat, we recorded the sex, reproductive status, and age (adults: ossified digits, subadults: visible growth plates near joints) and additionally measured forearm length and body mass. We selected 91 adult individuals of <i>P. kuhlii</i> and <i>P. nathusii</i> for tagging, which showed no signs of physical constraints such as injuries and unusually high ectoparasite load (ticks, mites or bat flies). We shortened the dorsal hair of the bats between their shoulder blades and attached Very-High-Frequency (VHF)-Transmitters (LB-2x, Holohil Systems Ltd., Ontario, Canada) using surgical skin glue (Manfred Sauer GmbH, Lobbach, Germany). VHF transmitters weighed 0.27 g and 0.31 g, corresponding to 2.7 to 5.2% of the individual bat body mass (mean 3.9 ± 0.5%, Table S1). Tagged bats were kept in bags for five minutes to ensure complete hardening of the glue and released afterwards. The identification and tagging procedure from capturing to release lasted for a maximum of 30 minutes.
Reporting on sex	Given the limited number of female <i>P. nathusii</i> in our sample, we excluded sex as a factor in the individual niche analyses. This reflects the typical sex ratio imbalance observed in Central European populations and does not compromise the validity of our results.
Field-collected samples	To conduct a metabarcoding analysis, we collected bat guano directly from captured bats. The guano was immediately transferred to Eppendorf tubes and stored on dry ice. Upon returning from the field, we maintained the samples at -20°C for up to three months before relocating them to -80°C for long-term storage.
Ethics oversight	All animal experiments were conducted with permits from the Austrian Ministry of Education, Science and Research (2022-0.137.202) and the local administration of Land Burgenland (A4/NR.AB-10122-5-2022).

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Plants

Seed stocks

NA

Novel plant genotypes

NA

Authentication

NA