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Rhinolophus blasii

Jere, C., Bücs, S., Csósz, I., Szodoray-Paradi, F. & Barti, L. (2017). The northernmost *Rhinolophus blasii* colony in Europe: permanent presence in the Pădurea Craiului Mountains, Romania. *North-Western Journal of Zoology*, 13(1): 163-168.

The status and distribution of Blasius's horseshoe bat *Rhinolophus blasii* in Romania is largely unknown. Historical records suggest the presence of the species mainly in the south-western part of the country, and also in the lower Mures Valley, Metaliferi and Trascau Mountains. However, old faunistic data are questionable, due to the difficult identification of medium-sized horseshoe bats and also due to the sympatric presence of the Mediterranean horseshoe bat *Rhinolophus euryale*. Recent and regular monitoring in North-Western Romania confirms the presence of the species in the Galaseni Cave, Padurea Craiului Mountains, in the northern part of the Apuseni mountains range. Formerly considered to be a 100% *R. euryale* colony, it is actually a colony where there are indications of seasonal *R. blasii* dominance. With this data, we provide the northernmost distribution point of *R. blasii* in Europe.

Eptesicus isabellinus

Dalhousi, R., Morellet, N., Aissa, P. & Aulagnier, S. (2017). Seasonal activity pattern and habitat use by the Isabelline serotine bat (*Eptesicus isabellinus*) in an arid environment of Tunisia. *Acta Chiropterologica*, 19(1): 141-153.

The seasonal activity of the Isabelline serotine bat *Eptesicus isabellinus* was studied in eight habitats of the Bou Hedma National Park, central Tunisia. From June 2010 to June 2011 two techniques, mist-netting and echolocation call recording, were implemented. This bat species was captured throughout the year but only at water bodies and

particularly at Nouh basin. Captures peaked in late spring-early summer, and declined in winter. Pregnant females were captured from April to June, and lactating females in May and June. Echolocation calls were recorded throughout the year, but not every month in all habitats. Most activity was reported at water bodies and street lamps. Activity peaked in late spring and early autumn, and declined during winter period. Terminal buzzes were mainly detected at basins, peaking in late spring-early summer and early autumn. Our study provided further insights on the importance of water bodies which should draw particular attention in the management plan of the national park and in the whole country. Dalhoumi, R., Aissa, P. & Aulagnier, S. (2016). Bat species richness and activity in Bou Hedma National Park (central Tunisia). *Turkish Journal of Zoology*, 40(6): 864-875.

In order to investigate the likely contact of the Mediterranean and Saharan faunas, we surveyed bats in six different habitats of Bou Hedma National Park for 1 year. We sampled bats monthly by mist-netting and echolocation call detection at two basins, Bordj and Nouh, the Bou Hedma wadi, and open and dense acacia forest and steppe. We identified 13 species, among which *Pipistrellus kuhlii*, *Eptesicus isabellinus*, and *Miniopterus schreibersii* were the most abundant and frequent, followed by *Tadarida teniotis*, *Plecotus gaisleri*, and two Saharan species, *Rhinopoma cystops* and *Otonycteris hemprichii*. We also rarely recorded four rhinolophids: *Rhinolophus euryale*, *R. ferrumequinum*, *R. hipposideros*, and *R. mehelyi*. Bat activity was recorded throughout the year in the six habitats, water bodies being more attractive than dry habitats for both Mediterranean and Saharan taxa. The wadi was the preferred habitat of *R. cystops*, *T. teniotis*, and *O. hemprichii*. The open acacia forest was attractive only during the flowering season. Species richness and bat activity peaked in late spring and reached the lowest values, but was still present, during winter.

Dalhoumi, R., Aissa, P. & Aulagnier, S., (2015). Cycle annuel d'activité des Chiroptères du Parc National de Bou-Hedma (Tunisie). *Revue d'Ecologie*, 70(3): 261-270.

Bats were mist-netted in six main habitats of the Bou-Hedma National Park over two years. Most of the seven recorded species are widely distributed in northwestern Africa, except the Saharan *Otonycteris hemprichii*. Basins of Bordj and Nouh were the most attractive for bats, mainly in early summer. Oued Bou-Hedma was less attractive, particularly in winter. No bat was mist-netted in the steppe and the two types of Acacia forest, which supports the major role of water bodies in the Mediterranean area. Winter activity of bats was detected and tentatively quantified. Also informative is the fact that captures peaked when most *Pipistrellus kuhlii* and *Eptesicus isabellinus* were pregnant or lactating.

Lisón, F., López-Espinosa, J.A., Calvo, J.F. & Jones, G. (2015). Diet of the meridional serotine *Eptesicus isabellinus* in an urban semiarid Mediterranean landscape. *Acta Chiropterologica*, 17(2): 371-378.

The Meridional serotine *Eptesicus isabellinus* (Temminck, 1840) has recently been identified as a cryptic species that occurs in the south of the Iberian Peninsula. Little is known about its ecology. We used morphological analysis of droppings from an urban semiarid Mediterranean landscape to determine seasonal differences in diet. We identified 15 insect prey types and found significant seasonal differences in the consumption of seven prey types. The diet of *E. isabellinus* was dominated by Scarabaeidae (Coleoptera) and Diptera, and there were seasonal changes in the consumption of Carabidae (Coleoptera), Lepidoptera and Cercopidae (Hemiptera). Shannon-Wiener and Levins' indices showed that the diet was more diverse during the post-hibernation and pregnancy periods. Pianka's index showed that there was relatively low dietary overlap between periods. The seasonal changes recorded between different physiological periods could be related to changes in the energetic needs of the individual or to variation in prey availability. Although *E. isabellinus* mainly eats Scarabaeidae and Diptera, it can show flexibility for example by hunting insects that fly around blossoms such as chafers *Melolontha* spp.

Mendes, E.S., Pereira, M.J.R., Marques, S.F. & Fonseca, C. (2014). A mosaic of opportunities? Spatio-temporal patterns of bat diversity and activity in a strongly humanized Mediterranean wetland. *European Journal of Wildlife Research*, 60(4): 651-664.

The Baixo Vouga Lagunar (BVL) landscape, in the Portuguese central-west coast, harbours a mosaic of wetland habitat types, interspersed by intensive and extensive agricultural fields, pastures, production forests and urban areas. In this study, we aimed to determine the species composition and the structure of the bat assemblages of the different habitats that constitute this heterogeneous landscape and to investigate seasonal changes in the patterns of bat diversity and activity across habitats. We acoustically sampled bats across 24 sampling sites representative of the eight main habitat types that shape the landscape-Bocage, forests, maize fields, marshlands, reed beds, rice fields, sea rushes and urban settlements. We compared bat richness, diversity and evenness across habitat types and seasons. We analysed habitat-specific and season-specific overall bat activity, and because habitat selection by bats is known to reflect morphological characters, foraging strategies and echolocation call structures, we also analysed the activity of individual species and of eco-morphological guilds. From

1,544 bat-passes recorded, we identified 12 species. *Pipistrellus pygmaeus*, *Pipistrellus pipistrellus* and *Eptesicus serotinus/Eptesicus isabellinus* were the most frequently recorded. Species composition and activity were similar across habitats, whilst exhibiting strong seasonal dynamics within habitats. Our results suggest that the mosaicism of the landscape provides several opportunities for bats, enabling them to explore different resources in distinct habitat patches. However, it may also reflect a forced exploitation of less optimal habitats and resources by bats, due to the scarcity of opportunities provided by fragmented landscapes.

Santos, H., Juste, J., Ibáñez, C., Palmeirim, J.M., Godinho, R., Amorim, F., Alves P., Costa H., De Paz O., Pérez-Suarez G., Martínez-Alos S., Jones G. & Rebelo H.. (2014). Influences of ecology and biogeography on shaping the distributions of cryptic species: three bat tales in Iberia. *Biological Journal of the Linnean Society*, 112(1): 150-162.

To determine what shapes the distributions of cryptic species, we aimed to unravel ecological niches and geographical distributions of three cryptic bat species complexes in Iberia, *Plecotus auritus/begognae*, *Myotis mystacinus/alcaethoe* and *Eptesicus serotinus/isabellinus* (with 44, 69, 66, 27, 121 and 216 records, respectively), considering ecological interactions and biogeographical patterns. Species distribution models (SDMs) were built using a presence-only technique (Maxent), incorporating genetically identified species records with environmental variables (climate, habitat, topography). The most relevant variables for each species' distribution and respective response curves were then determined. SDMs for each species were overlapped to assess the contact zones within each complex. Niche analyses were performed using niche metrics and spatial principal component analyses to study niche overlap and breadth. The *Plecotus* complex showed a parapatric distribution, although having similar biogeographical affinities (Eurosiberian), possibly explained by competitive exclusion. The *Myotis* complex also showed Eurosiberian affinities, with high overlap between niches and distribution, suggesting resource partitioning between species. Finally, *E. serotinus* was associated with Eurosiberian areas, while *E. isabellinus* occurred in Mediterranean areas, suggesting possible competition in their restricted contact zone. This study highlights the relevance of considering potential ecological interactions between similarly ecological species when assessing species distributions.

Dalhoumi, R., Hedfi, A., Aissa, P. & Aulagnier, S. (2014). Bats of Jebel Mghilla National Park (central Tunisia): first survey and habitat-related activity. *Tropical Zoology*, 27(2): 53-62.

We surveyed the bat fauna of the Jebel Mghilla National Park (central Tunisia) in the five main habitats from the lowland to the summit: cultivated area, open juniper (*Juniperus* spp.) forest, *Stipa tenacissima* steppe, open and dense forest of *Pinus halepensis*, with a special emphasis on water bodies. We mist-netted three bat species: *Eptesicus isabellinus*, *Myotis emarginatus* and *Myotis punicus*. We also identified echolocation calls of *Rhinolophus blasii*, *Rhinolophus ferrumequinum*, *Rhinolophus hipposideros*, *Tadarida teniotis*, *Miniopterus schreibersii*, *Pipistrellus kuhlii*, *Plecotus gaisleri* and *Hypsugo savii*. *Pipistrellus kuhlii* and *E. isabellinus* were the most active and widely distributed species. The bat fauna was richer in the dense and open pine forest than in cultivated area and open juniper forest, but water bodies are also very attractive for bats.

Lisón, F. & Calvo, J.F. (2014). Bat activity over small ponds in dry Mediterranean forests: implications for conservation. *Acta Chiropterologica*, 16(1): 95-101.

In dry Mediterranean forests, ponds constitute essential water resources for animals, especially during summer months. In southeastern Spain, land use changes and the human abandonment of mountainous zones have led to the loss of many ponds. These ponds are scarce landscape elements and, despite their usually small size (< 1,000 m²), they support a considerable amount of biodiversity. We studied the patterns of use of these ponds by bats during the activity season in dry forest landscapes of a Mediterranean region using acoustic monitoring. Our hypothesis was that these ponds are valuable landscape elements for bats, and bat activity and richness species will be high over them. Bat activity and species richness were compared between ponds and adjacent sampling points in the forest matrix. We recorded 14 bat species and our results show that both general bat activity (all species grouped together) and species richness were higher in the ponds than in the forest areas. Bat activity was higher in June, however it decreased during drier months (July–August), while activity in the forest increased. The number of species was constant in the areas surrounding the ponds through the study period, but in the forest we observed an increase in July and a gradual decrease in August–September. Similar results were obtained for most individual species, although in some species activity was also influenced by temporal variables. Our study shows that the maintenance of small ponds may have important consequences for bat conservation, as they support high bat diversity, including some species of conservation concern like horseshoe bats (*Rhinolophus* spp.) or *Myotis* spp.

Lisón, F., Haz, Á. & Calvo, J.F. (2014). Preferencia de hábitat del murciélago hortelano meridional *Eptesicus isabellinus* (Temminck, 1840) en ambientes mediterráneos semiáridos. *Animal Biodiversity and Conservation*, 37(1): 59-67.

Several molecular studies have recently reported the presence of a second species of the genus *Eptesicus* in the Iberian peninsula, the Meridional serotine bat, *E. isabellinus*. This species is present in the south of Iberia and it seems to have an allopatric distribution with its twin species, *E. serotinus*. Ecological studies are now needed to understand the biology of *E. isabellinus* in southeast Spain. In this study, we used presence only data for *E. isabellinus* to perform an ecological niche factor analysis (ENFA) and to create a habitat suitability map (HSM). Our results show that the species has a low marginality index, suggesting it is well adapted to the semiarid conditions of the study area. The main habitats used by *E. isabellinus* are water courses, scrublands, and zones with high primary productivity. The species avoids non irrigated cropland and shows no preference for human settlements or irrigated cropland. This study provides information about the ecology of *E. isabellinus* in southeast Spain and allows us to discuss relevant aspects for its conservation.

Plecotus kolombatovici

Plecotus sardus

Bosso, L., Mucedda, M., Fichera, G., Kiefer, A. & Russo, D. (2016). A gap analysis for threatened bat populations on Sardinia. *Hystrix, the Italian Journal of Mammalogy*, 27(2).

Sardinia is home to three bat species of chief conservation importance, the endemic *Plecotus sardus* as well as *Myotis punicus* and *Rhinolophus mehelyi*, for which the island constitutes the Italian stronghold. We carried out two gap analyses by overlapping the network of protected areas present on Sardinia respectively with 1) the occurrence records of all species and 2) the binarized maps obtained from maximum entropy models. Unlike the other two species, *P. sardus* known records are confined to the central sector of the island and its suitable habitat partly overlaps with that of *M. punicus* but not with *R. mehelyi*. Due to its uniqueness and restricted range *P. sardus* requires a very specific management strategy for its protection to be successful. Both analyses led to the conclusion that all species considered require more extensive protection than is currently granted so that urgent measures should be taken to improve the current situation.

Plecotus teneriffae

Nyctalus lasiopterus

Estók, P., Görföl, T., Szőke, K. & Barti, L. (2017). Records of Greater noctule bat (*Nyctalus lasiopterus*) from Romania-with new additions. *North-Western Journal of Zoology*, 13(2): 375-376.

Langheld, M. (2017). The impact of predation by the Tawny owl *Strix aluco* on the roost switching behavior of the Greater noctule bat *Nyctalus lasiopterus*. Doctoral dissertation, Universität Hamburg.

Pastor Beviá, D. (2017). Ecología trófica del nóctulo grande (*Nyctalus lasiopterus*), un murciélago depredador de aves.

Esta tesis ha permitido poner a punto una metodología de extracción y amplificación de ADN de pájaros a partir de excrementos de murciélago, sentando las bases moleculares para poder arrojar un halo de luz sobre la composición aviar de las dietas, método de caza empleado y selección de las presas de 2 de las 3 especies de murciélagos del Paleártico que complementan su dieta insectívora consumiendo aves durante los desplazamientos migratorios nocturnos de passeriformes.

Beucher, Y. & Bernard, T. (2016). La Grande noctule (*Nyctalus lasiopterus*) dans le Puy-de-Dôme : découverte d'une colonie de mise bas et suivi d'activité par une méthode sans capture. *Symbioses*, N.S. 34: 9-13.

L'article présente les résultats de deux sessions (2012-2013) de suivi de colonies de mise bas de la Grande noctule découvertes par le bureau d'étude EXEN dans le Puy-de-Dôme en 2012. La découverte des gîtes a été rendue possible sans capture, par le développement d'une méthode de poursuites des retours aux gîtes en fin de nuit, basée sur une approche à la fois acoustique (suivis passifs, semi-passifs et passifs) et visuelle via une équipe de chiroptérologues. Mais les suivis ont également exploité des méthodes plus classiques de capture/ télémétrie, des outils de vision nocturne (amplificateur de lumière) ou un boîtier Batcorder autonome relevant en continu et pendant 5.5 mois, l'activité des chauves-souris au-dessus de la canopée dans le secteur de gîtes. L'innovation méthodologique ouvre de nouvelles perspectives de découvertes de gîtes sans capture aussi bien pour la Grande noctule que pour d'autres espèces difficiles à suivre. Localement, les données générées par cette méthode permettent aussi de caractériser finement les modalités de fréquentation du site par l'espèce et donc les fonctionnalités des habitats. Mais plus largement, les preuves de reproduction de la Grande noctule en Auvergne ébranlent aussi les hypothèses avancées par l'expérience espagnole sur les préférences les plus influents vis-à-vis du choix des zones de mise bas, sur les migrations latitudinales et altitudinales, et sur les notions de ségrégations sexuelles des migrations.

Dombrovski, V., Fenchuk, V. & Zhurauliou, D. (2016). New occurrence and the first breeding record of *Nyctalus lasiopterus* in Belarus. *Vespertilio*, 18: 55-59.

In June–July 2015, bat surveys were conducted by mist-netting at the Stary Žadzien Ramsar Site in Belarus. During this period, two adult lactating females and two subadults (male and female) of the Greater noctule (*Nyctalus lasiopterus*) were caught there. Later on, two nursery colonies of *N. lasiopterus* were found by radio-tracking of subadults and roost characteristics of the species were described. Using mist-netting, 12 bat species were recorded in the area, five of which are listed in the Red Data Book of the Republic of Belarus: *Barbastella barbastellus*, *Myotis brandtii*, *M. nattereri*, *Eptesicus nilssonii*, and *Nyctalus leisleri*. Besides the first record of breeding of *N. lasiopterus* in Belarus, the large number of rare bat species recorded suggests significance of the forest-mire complexes of Polesie (Pripât River valley) for conservation of biological diversity in the region.

Gaches, L., Bec, J. & Dubourg-Savage, M.J. (2016). La Grande noctule (*Nyctalus lasiopterus*) en Midi-Pyrénées : bilan de 2 ans de suivi. *Symbioses*, N.S. 34: 61-62.

Girard-Claudon, J. & Ribatto, E. (2016). Découverte d'une population reproductrice de Grande noctule (*Nyctalus lasiopterus*) dans le département du Rhône. *Bièvre*, 28 : 72-74.

Ibáñez, C., Popa-Lisseanu, A.G., Pastor-Beviá, D., García-Mudarra, J.L. & Juste, J. (2016). Concealed by darkness: interactions between predatory bats and nocturnally migrating songbirds illuminated by DNA sequencing. *Molecular Ecology*, 25(20): 5254-5263.

Recently, several species of aerial-hawking bats have been found to prey on migrating songbirds, but details on this behaviour and its relevance for bird migration are still unclear. We sequenced avian DNA in feather-containing scats of the bird-feeding bat *Nyctalus lasiopterus* from Spain collected during bird migration seasons. We found very high prey diversity, with 31 bird species from eight families of Passeriformes, almost all of which were nocturnally flying sub-Saharan migrants. Moreover, species using tree hollows or nest boxes in the study area during migration periods were not present in the bats' diet, indicating that birds are solely captured on the wing during night-time passage. Additional to a generalist feeding strategy, we found that bats selected medium-sized bird species, thereby presumably optimizing their energetic cost-benefit balance and injury risk. Surprisingly, bats preyed upon birds half their own body mass. This shows that the 5% prey to predator body mass ratio traditionally assumed for aerial hunting bats does not apply to this hunting strategy or even underestimates these animals' behavioural and mechanical abilities. Considering the bats' generalist feeding strategy and their large prey

size range, we suggest that nocturnal bat predation may have influenced the evolution of bird migration strategies and behaviour.

Santos, J.D., Meyer, C.F., Ibáñez, C., Popa-Lisseanu, A.G. & Juste, J. (2016). Dispersal and group formation dynamics in a rare and endangered temperate forest bat (*Nyctalus lasiopterus*, Chiroptera: Vespertilionidae). *Ecology and evolution*, 6(22): 8193-8204.

For elusive mammals like bats, colonization of new areas and colony formation are poorly understood, as is their relationship with the genetic structure of populations. Understanding dispersal and group formation behaviors is critical not only for a better comprehension of mammalian social dynamics, but also for guiding conservation efforts of rare and endangered species. Using nuclear and mitochondrial markers, we studied patterns of genetic diversity and differentiation among and within breeding colonies of giant noctule bats (*Nyctalus lasiopterus*), their relation to a new colony still in formation, and the impact of this ongoing process on the regionwide genetic makeup. Nuclear differentiation among colonies was relatively low and mostly nonsignificant. Mitochondrial variation followed this pattern, contrasting with findings for other temperate bat species. Our results suggest that this may indicate a recent population expansion. On average, female giant noctules were not more closely related to other colony members than to foreign individuals. This was also true for members of the newly forming colony and those of another, older group sampled shortly after its formation, suggesting that contrary to findings for other temperate bats, giant noctule colonies are not founded by relatives. However, mother-daughter pairs were found in the same populations more often than expected under random dispersal. Given this indication of philopatry, the lack of mitochondrial differentiation among most colonies in the region is probably due to the combination of a recent population expansion and group formation events.

Vlaschenko, A., Kravchenko, K., Prylutska, A., Ivancheva, E., Sitnikova, E. & Mishin, A. (2016). Structure of summer bat assemblages in forests in European Russia. *Turkish Journal of Zoology*, 40(6): 876-893.

We used mist-netting to study summer bat assemblages in 3 state nature biosphere reserves in the European part of Russia from 26 June to 29 July 2013: Oksky, Ryazan region (54 degrees 44'N, 40 degrees 54'E); Voronezhsky, Voronezh region (51 degrees 55'N, 39 degrees 38'E); and "Bryansky Les", Bryansk region (52 degrees 27'N, 33 degrees 53'E). The main research efforts were in locations where *Nyctalus lasiopterus* had been captured in the past. In total, 1229 specimens of 12 bat species (*Myotis daubentonii*, *M. dasycneme*, *M. brandtii*, *M. mystacinus*, *Nyctalus noctula*, *N. lasiopterus*,

N. leisleri, *Eptesicus serotinus*, *Pipistrellus nathusii*, *P. pygmaeus*, *Vespertilio murinus*, and *Plecotus auritus*) were caught. *N. lasiopterus* (a female subadult) was confirmed only in the Voronezhsky Reserve. The bat assemblages could be classified as forest-dwelling and dominated by long-distance migratory species (genera *Nyctalus*, *Pipistrellus*, and *Vespertilio*). Females also dominated and breeding was recorded for most of the species. The highest bat abundance (b/h index: 4.54) was in the Voronezhsky Reserve (the most southeasterly location) and the lowest (b/h index: 1.75) was in "Bryansky Les" (the most southwesterly location). The Shannon-Wiener index was higher in the Voronezhsky and Oksky Reserves but the evenness index was similar for all reserves. Bat assemblage structure in strictly protected forest areas (such as the Voronezhsky Reserve) has been stable for decades.

Popa-Lisseanu, A.G., Kramer-Schadt, S., Quetglas, J., Delgado-Huertas, A., Kelm, D.H. & Ibáñez, C. (2015). Seasonal variation in stable carbon and nitrogen isotope values of bats reflect environmental baselines. PLoS ONE, 10(2): e0117052.

The stable carbon and nitrogen isotope composition of animal tissues is commonly used to trace wildlife diets and analyze food chains. Changes in an animal's isotopic values over time are generally assumed to indicate diet shifts or, less frequently, physiological changes. Although plant isotopic values are known to correlate with climatic seasonality, only a few studies restricted to aquatic environments have investigated whether temporal isotopic variation in consumers may also reflect environmental baselines through trophic propagation. We modeled the monthly variation in carbon and nitrogen isotope values in whole blood of four insectivorous bat species occupying different foraging niches in southern Spain. We found a common pattern of isotopic variation independent of feeding habits, with an overall change as large as or larger than one trophic step. Physiological changes related to reproduction or to fat deposition prior to hibernation had no effect on isotopic variation, but juvenile bats had higher $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values than adults. Aridity was the factor that best explained isotopic variation: bat blood became enriched in both ^{13}C and ^{15}N after hotter and/or drier periods. Our study is the first to show that consumers in terrestrial ecosystems reflect seasonal environmental dynamics in their isotope values. We highlight the danger of misinterpreting stable isotope data when not accounting for seasonal isotopic baselines in food web studies. Understanding how environmental seasonality is integrated in animals' isotope values will be crucial for developing reliable methods to use stable isotopes as dietary tracers.

Hernández-Brito, D., Carrete, M., Popa-Lisseanu, A.G., Ibáñez, C. & Tella, J.L. (2014). Crowding in the city: Losing and winning competitors of an invasive bird. *PLoS ONE* 9(6): e100593.

Invasive species can take advantage of resources unexploited by natives (opportunism hypothesis) or they can exploit the same resources but more aggressively or efficiently (competition hypothesis), thus impacting native species. However, invasive species tend to exploit anthropogenic habitats that are inefficiently used by natives such as urban environments. Focusing on the ring-necked parakeet (*Psittacula krameri*), one of the most invasive birds worldwide, we combined observations of interspecific aggressions, species-specific cavity-nest preferences and the spatial distribution of the native cavity-nesting vertebrate community to determine the invasion process as well as its potential impacts on native species in a Mediterranean city. Our results support the competition hypothesis, suggesting that ring-necked parakeets are outcompeting native species sharing nest-site preferences. Parakeets initiated and won most interspecific aggressions, which were directed towards competitors but also towards predators. This behaviour could explain the spatial arrangement of natives, with most bird species breeding close to parakeets possibly to take advantage of their effective antipredatory behaviour. However, temporal and spatial patterns of segregation suggest that a threatened bat species is negatively affected by parakeets. This demonstrates that common species gain benefits and threatened ones (in this study, a bat and possibly a falcon) lose nest sites due to invaders. Therefore, the conservation status of the native species that pay the costs of competition with invaders should be considered. This scenario of winners and losers may, however, shift towards more losers if the ring-necked parakeet population continues to grow, thus requiring close monitoring and control/eradication programs to avoid further impacts.

Smirnov, D. G. & Vekhnik, V. P. (2014). Ecology of nutrition and differentiation of the trophic niches of bats (Chiroptera: Vespertilionidae) in floodplain ecosystems of the Samara Bend. *Biology Bulletin*, 41(1): 60-70.

A complex analysis of the food range of 15 bat species inhabiting floodplain ecosystems of the Samara Bend has been performed. It is shown that, in bats, an important component of the structuring of their communities is the division of food resources. The guild structure and position of species in the trophic space are described. Seven food guilds consisting of nonspecialized and specialized species are distinguished. It is noted that most species are characterized by a wide overlapping of their trophic niches, which

may be a consequence of their weak competition in an environment that is rich in food resources.

Pipistrellus hanaki

Pipistrellus maderensiss

Myotis escalerae

Barros, P.A., Ribeiro, C. & CAbral, J.A. (2017). Winter activity of bats in Mediterranean peri-urban deciduous forests. *Acta Chiropterologica*, 19(2): 367-377.

Although the Vespertilionid bats typically hibernate during the winter to minimize energy expenditure in the cold months, in the temperate regions torpor breaks can be rather frequent. The aim of our study was to conduct a preliminary characterisation of the winter bat activity patterns in Mediterranean peri-urban deciduous forests of North Portugal. Echolocation calls were recorded between November and February, and bat activity was regularly detected on warm evenings, with sun set temperatures above 4.6°C during the night sampling, mostly in November (89.9%), only rarely in December (3.7%) and February (6.4%) and without activity detected in January. The most commonly recorded species were *Pipistrellus pygmaeus*, *P. pipistrellus*, and *P. kuhlii*. Socialization activity was mostly concentrated in November (96.8%), only with rare records in February (3.2%) and absent in December and January. Regarding the best fitting average model, obtained by the Multi-Model Inference (MMI) method to explaining the variation of bat passes, the main positive influencing factors are related with the night period of the monitoring process and temperature, and the negative influence with the precipitation recorded in the last 48 hours before surveys. The MMI results for the variation of social calls revealed as significant positive influences the humidity, temperature and wind speed and as negative influence the precipitation recorded in the last 48 hours before surveys. We outline our study as a promising baseline to the studies of winter bat activity, demonstrating how the present and past weather conditions can play a major role in bat torpor breaks. Therefore, for conservation purposes, further winter acoustic research efforts should be consider mandatory for full understanding the bat activity patterns facing the potential impacts of global climatic changes expected to occur in the Mediterranean region.

García-Ruiz, I., Machado, M., Monsalve, M.Á. & Monrós, J.S. (2017). Phenology of emergence by Mediterranean sympatric cave-dwelling bats during their breeding period. *Acta Chiropterologica*, 19(2): 357-365.

The emergence of cave-dwelling bats can be influenced by multiple variables, such as diurnal predator evasion, energetic requirements, and prey abundance. This work aimed to determine emergence patterns of cave-dwelling bat species from roosts over the April-July 2013 period in the Valencian Community (East Spain) by infrared camera and acoustic recordings. We observed that *Miniopterus schreibersii* left earliest followed by the *Myotis myotis/blythii* group and *Myotis capaccinii* and finally *Myotis escaleraei*. This pattern of emergence was observed in four roosts with no significant differences. *Miniopterus schreibersii* tended to display quicker flight in open areas, compared to the *Myotis* genus. Moreover, the *M. myotis/blythii* group and *M. capaccinii* were larger in size and had a greater wing loading than *M. escaleraei*. Therefore, variations in emergence times may be due to differences in predation pressure by diurnal and crepuscular predators, which would enable large and fast bats like *M. schreibersii* to leave earlier, and thus, perhaps take advantage of insect abundance peaks. Another finding was that bats in general left earlier in relation to sunset in summer (particularly in June) than in spring. Differences between months could be attributed to the presence of lactating females in May and June in the genus *Myotis*, which have higher energetic demands than other reproductive classes and may need to forage for a longer time or travel to further distances. Different results were obtained for *M. schreibersii*, indicating different ecological pressures for this species.

Machado, M.C., Monsalve, M.A., Castelló, A., Almenar, D., Alcocer, A. & Monrós, J.S. (2017). Population trends of cave-dwelling bats in the Eastern Iberian Peninsula and the effect of protecting their roosts. *Acta Chiropterologica*, 19(1), 107-118.

Populations trends of cave-dwelling bats in the Eastern Iberian Peninsula and the effect of placing a perimeter fencing around their roosts (to avoid human disturbance on breeding colonies) were evaluated from 1997 to 2014. The species with the highest relative abundance was *Miniopterus schreibersii* (62.4%), followed by *Myotis myotis/blythii* (18%), and both populations showed positive trends. On the other hand, *Myotis capaccinii* (6.2%), *M. escaleraei* (4.8%) and *M. emarginatus* (0.9%) showed significant, but minor increases, particularly in recent years. *Rhinolophus mehelyi* (0.2%) displayed no significant trends, while a moderate population decline was recorded for *R. euryale* (5.1%). *Rhinolophus ferrumequinum* (2.2%) and *R. hipposideros* (0.1%) showed positive growth trends. The main assemblages in the evaluated roosts were formed by *Myotis myotis/blythii*, *Miniopterus schreibersii* and *R. ferrumequinum*. This denotes their less specific requirements or greater flexibility when selecting roosts, compared with other species, except for *M. capaccinii* and *R. mehelyi*. No significant differences were found

between roosts with different levels of protection, but there were positive trends in the protected roosts. Most non-fenced cavities showed negative trends during the period evaluated. We did not rule out other factors, such as requiring habitats with optimum food sources next to maternal roosts, which could affect population growth. The selectivity of some species of bats for certain caves will be essential for the preparation of management plans for certain roosts. Four of the seven risk factors documented for European bats affect studied population. *Myotis blythii*, *M. myotis* and *Rhinolophus euryale* would be most affected by a reduction in the areas they currently occupy.

Herrera, J.M., Costa, P., Medinas, D., Marques, J.T. & Mira, A. (2015). Community composition and activity of insectivorous bats in Mediterranean olive farms. *Animal Conservation*, 18(6): 557-566.

Olive (*Olea europaea* L.) farming is one of the most widespread agricultural practice throughout the Mediterranean basin. Current trends even predict an increase in land area devoted to olive farms as well as the intensification of farming practices. However, knowledge of the effects of olive farming on animal species still remains elusive and conservation and management guidelines for the relevant stakeholders are therefore urgently needed. Here, we investigate community composition and activity patterns of insectivorous bats in Mediterranean olive monocultures in Southern Portugal. Bats surveys were carried out in three types of olive farms representing increasing levels of management intensity: (1) traditional olive farms, managed with few or no chemical inputs or manual labor; (2) semi-intensive olive farms, which share certain characteristics with traditional plantations, but are more intensively managed; (3) intensive olive farms, which are managed with high and frequent chemical inputs, and highly mechanized systems. We found differences in species richness and activity levels between farming practices. Both the number of species and foraging activity declined with increasing management intensity. However, olive groves as a whole showed a lower number of species compared with the regional species pool and extremely low activity levels, suggesting that large and homogeneous olive monocultures may serve more as commuting areas than true foraging habitats for bats. To our knowledge, this is the first study explicitly demonstrating the pervasive impact of olive farming on the community composition and activity levels of insectivorous bats. In the face of an even-increasing proportion of land surface devoted to olive farming in Mediterranean landscapes, our findings are therefore of great concern. We suggest that increasing habitat heterogeneity would contribute to preserve the community composition and ecological functionality of insectivorous bats in extensive olive monocultures.