

Observations made at three church bat (Chiroptera) roosts in central Slovenia

Opazanja s treh cerkvenih zatočišč netopirjev (Chiroptera) v osrednji Sloveniji

Jan GOJZNIKAR, Migojnice 90, SI-3302 Griže;

E-mail: jan.gojznikar.pb@gmail.com

Tim ZAVERŠEK, Ulica Alme Karlinove 31, SI-3000

Celje; E-mail: tim.zaversek@gmail.com

Anja BOLČINA, Cesta na Svetino 19, SI-3270

Laško; E-mail: bolcina.anja@gmail.com

Church buildings in Slovenia have long been known as suitable nursery roosts for several bat (Chiroptera) species (Presetnik et al. 2009), which require a warm environment to raise their young during the summer. Knowing which churches are utilized by bats as roosts is therefore highly important for bat conservation. During late spring and early summer of 2020, we visited three church roosts of lesser horseshoe bat (*Rhinolophus hipposideros*) in the Savinjska region, Central Slovenia. These churches were St. Neža at Liboje, St. Magdalena on Hom hill (Matke) and Sts. Mohor and Fortunat on Šmohor hill (Tab. 1), which had been inspected in the past (Hercog 2013, own data) and are known to host larger roosts of the species. We decided to inspect these churches to record their present status and to assess the current size of their respective reproductive colonies.

Bats were counted when exiting the roost in the evening. Each roost was inspected twice – initially, a preliminary evening visit was made to assess flight patterns and emergence openings, and later a thorough count of emerging bats was conducted. The count began 5-10 minutes before sunset with bats being counted until 15 minutes after the last confirmed emergence from the roost. *R. hipposideros* were identified using a heterodyne ultrasound detector (D200, Pettersson Elektronik) at 110 kHz, while additional detectors were used to search for other possible bat species. Since female *R. hipposideros* near our survey area were noted to give birth from mid-June onwards (Hercog 2013), we assumed all emerging individuals of the species were adults. On 25. 6. 2020 (Tab. 1) we also deployed hand nets at St. Magdalena Church in

order to determine one of the species present there, using determination key in Dietz & Kiefer (2016).

Apart from confirming *R. hipposideros* presence during all our surveys (Tab. 1), we recorded two other bat species - the greater horseshoe bat (*R. ferrumequinum*) and the whiskered bat (*Myotis mystacinus*). We also noted individual bats which we were unable to distinguish to species or even family level, including an individual of a large bat species at Sts. Mohor and Fortunat (Tab. 1). Almost all bats used small windows and other apparent holes for their emergence, except for unidentified Vespertilionidae individuals at St. Neža, which emerged from slits between stone roof tiles of the bell tower.

To our knowledge, St. Neža Church had only been surveyed once in the past, when the first author of this contribution inspected the roost on 24. 8. 2017, observing 123 *R. hipposideros* of unknown sex and age, 28 adults, 38 juveniles, 2 adult females and one carcass. These numbers, combined with our recent findings of 217 adults, make this church a nursery roost with a very large maternity colony of the species in Slovenia (Pettrinjak 2009, Presetnik 2018). St. Magdalena on Hom hosts an even more numerous maternity colony - we recorded over a hundred more adult individuals of the species than Hercog (2013) in the season of 2011 (max. 245 compared to our 346). According to Presetnik (2018), our findings suggest that the church hosts among the largest, if not the largest currently known maternity colony of *R. hipposideros* in the country. The number of adult individuals of the species at Sts. Mohor and Fortunat is also slightly higher than the numbers found by Hercog (2013) (max. 59 adults compared to our 76). It is to be noted, however, that the emergence count conditions at the latter were much worse than at the other two churches, with emergence openings located much higher and heavy winds impairing our ability to detect bats. These conditions have contributed to the high number of unidentified individuals (Tab. 1). Although some, if not most, were probably *R. hipposideros*, we cannot exclude the possibility that some of them belonged to other bat species. Therefore, the interior of the Church of Sts. Mohor and Fortunat needs to be reinspected in the near future, in order to both assess the true number of *R. hipposideros* individuals present and to inspect for other bat species possibly present at the roost.

We also recorded some other interesting bat species. We have reconfirmed the presence of *R. ferrumequinum* at St. Magdalena, whereas we failed to register any serotine bats (*Eptesicus serotinus*) which were also recorded at the church previously (Hercog 2013). However, by far the most intriguing is our find of a nursery roost of *M. mystacinus*, which has not been observed at St. Magdalena in the past. Known nursery roosts of *M. mystacinus* in Slovenia are very rare, and so far, only two other church roosts were noted for this species, out of which one had already been destroyed (Likozar 2013). This finding, together with the remarkable number of detected *R. hipposideros* individuals during our survey, makes the church of St. Magdalena a roost of national importance.

Our results highlight that the Churches of St. Neža, Sts. Mohor and Fortunat, and especially St. Magdalena, are bat roosts of high conservational importance. None of these church nurseries are included in any nature conservation networks, such as Natura 2000 (Ur. l. RS 2004a) or Ecologically important areas (Ur. l. RS 2004b). We suggest that the churches be included in these areas, with conservation activities focusing especially on measures which promote peaceful coexistence of bats and church administrators (for examples see Kotnik et al. 2015). It might also be prudent to monitor the state of these important nurseries in the future.

Table 1. Results of bat emergence counts for three selected church bat roosts. Structures, used by individuals to emerge from the roost, are also given. AD – adult; emergence openings: BTO – bell tower openings, ATO – attic openings, BTR – slits in bell tower roof tiles.

Tabela 1. Rezultati štetja izletavanja za tri izbrane cerkve. Navedene so tudi izhodne strukture, ki so jih uporabljali netopirji. AD – odrasla žival; izhodne odprtine: BTO – odprtine/line na zvoniku, ATO – odprtine/line na podstrešju, BTR – reže med strešniki zvonika.

Site [lat. (°N), long. (°E), m a.s.l.]	Date	Notes	Taxa [No. of individuals]	Emergence openings
Church of St. Neža, Liboje [46.208026, 15.190633, 367]	27. 5. 2020	/	<i>R. hipposideros</i> [132] Vespertilionidae [2]	BTO, ATO BTR
	29. 5. 2020	/	<i>R. hipposideros</i> [217] Vespertilionidae [1]	BTO, ATO BTR
Church of St. Magdalena, Matke [46.218996, 15.125510, 602]	23. 6. 2020	/	<i>R. hipposideros</i> [336] <i>R. ferrumequinum</i> [1] Vespertilionidae [25] Chiroptera [10]	BTO, ATO ATO ATO ATO
	25. 6. 2020	terminated 90 min. after sunset – heavy rain	<i>R. hipposideros</i> [346] <i>R. ferrumequinum</i> [1] <i>M. mystacinus</i> [30 AD, 2 AD ♀, 2 AD ♀ – parous]	BTO, ATO ATO ATO
	27. 6. 2020	very windy conditions	<i>R. hipposideros</i> [76] Chiroptera [49] Chiroptera (large species) [1]	BTO BTO BTO
Church of Sts. Mohor and Fortunat, Šmohor [46.181568, 15.180067, 786]	1. 7. 2020	terminated 60 min. after sunset – heavy winds and lightning	<i>R. hipposideros</i> [59] Chiroptera [47]	BTO BTO

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