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Winter records of *Myotis alcathoe* in southern Poland and comments on identification of the species during hibernation

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Abstract. Single hibernating males of *Myotis alcathoe* were recorded in caves and mining adits at four localities in the Beskid Wyspowy Mts, Western Bieszczady Mts, Western Sudety Mts and Roztocze Upland. These are the first records of wintering individuals of the species in Poland and some of the first in Central Europe. Characters are described that may be useful for the identification of adult bats in winter roosts.

Key words: *Myotis alcathoe*, species identification, hibernation roosts, the Eastern Carpathians, the Western Sudety Mts, Roztocze Upland.

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The presence of *Myotis alcathoe* HELVERSEN et HELLER, 2001, has been confirmed in all Central European countries but Moldavia: Poland, Germany, Ukraine, Slovakia, Czech Republic, Austria, Slovenia, Hungary and Romania (BENDA et al. 2003; CSABA & DÓCZY 2007; NIERMANN et al. 2007; SPITZENBERGER et al. 2008; LUČAN et al. 2009; PRESETNIK et al. 2009; BASHTA et al. 2011). Though in the regional scale the species was reported as

rare and local (NIERMANN et al. 2007), results of research in the Czech Republic and Slovakia indicated that in suitable habitats it may be fairly abundant (LUČAN et al. 2009; DANKO et al. 2010).

Myotis alcathoe is closely associated with deciduous and mixed forests. Its summer roosts, including these of breeding colonies, are in crevices in trunks and under the loose bark of old trees (most often oaks), usually located high above the ground, in the canopy level (NIERMANN et al. 2007; LUČAN et al. 2009; DANKO et al. 2010). During summer swarming these bats are recorded in small numbers at cave entrances (NIERMANN et al. 2007; DIETZ et al. 2009; PIKSA et al. 2011). Winter roosts and hibernal ecology of the species is almost unknown. Confirming the use of underground roosts are records of single individuals hibernating in a tunnel in France and a mining adit in Harz Mts (NIERMANN et al. 2007; DIETZ et al. 2009; OHLENDORF 2009).

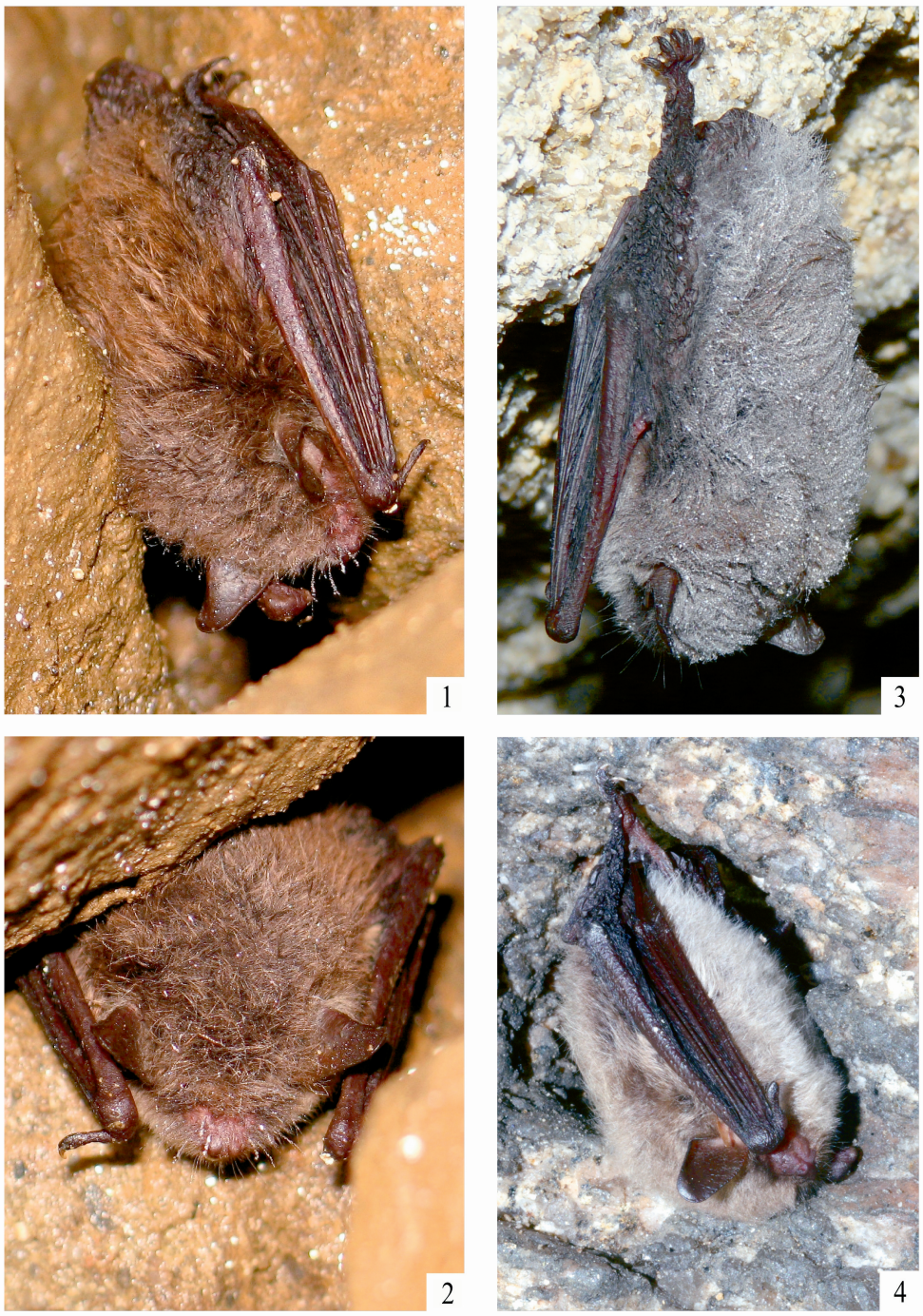
In Poland the species has been recorded in the Carpathians, Roztocze Upland, Silesian Lowland, Sudety Mts and Krakowska Upland since 2005. Most records concern bats netted at cave entrances, during summer swarming, but its reproduction was also confirmed at several localities (NIERMANN et al. 2007; SACHANOWICZ 2010; BASHTA et al. 2011; PIKSA et al. 2011, BOGDANOWICZ et al. 2012). It was proposed to provisionally rank the species among the rarest Polish bats (BASHTA et al. 2011). Lack of knowledge about hibernation roosts of this species makes winter monitoring of its number impossible and reduces conservation opportunities.

Herein, we describe the first winter records of *M. alcathoe* in Poland and some of the first in Central Europe. Single males were found during winter monitoring of the bat numbers at four localities. They hibernated in wet and relatively warm (temperature over 5°C) conditions close to the entrance of the underground roosts. All roosts were located in deciduous or mixed forest with beech *Fagus sylvatica*.

1. The cave Złotopieńska Dziura (20°16′01′′E, 49°42′11′′N, ca. 770 m a.s.l.), pseudocarstic crevice type cave, length ca. 105 m, depth 10 m, in the Mount Łopień in the Beskid Wyspowy Mts. The male (forearm length 30.9 mm) was observed on 17 February 2009. The bat hibernated in hall "Sala Złomisk" on the wall, ca. 15 m from the cave entrance. Other species recorded: *Rhinolophus hipposideros*, *Myotis myotis* and *Myotis mystacinus*.

2. The cave Dolna w Nasicznem (22°36′51′′E, 49°10′46′′N, 755 m a.s.l.), pseudocarstic crevice type cave, length ca. 60 m, depth 17 m, in the SE slope of Mount Jaskiniowa Góra in the Western Bieszczady Mts. The male (forearm length 30.7 mm, tibia length 14.2 mm, Figs 1-2) was recorded on 16 February 2011. The bat hibernated on the wall, between stones, ca. 1 m above the floor and ca. 6 m from the entrance. Other species recorded in the cave: *R. hipposideros*, *Plecotus auritus*, *M. myotis* and *M. mystacinus* sensu lato. Single males of *M. alcathoe* were netted at the cave entrance during swarming and leaving the cave on spring evening, suggesting possible wintering (BASHTA et al. 2011).

3. The abandoned sandstone adits in Senderki (23°03′04′′E, 50°32′24′′N, 223 m a.s.l.), length ca. 200 m, Roztocze Upland. The male (forearm length 31.8 mm, tibia length 14.4 mm, Fig. 3) was observed from 19 February till 25 March 2012. It hibernated in shallow hollow of the wall, ca. 20 m from the entrance, 1.7 m above the floor. Other species recorded: *M. myotis*, *Myotis bechsteinii*, *Myotis dasycneme*, *Myotis nattereri*, *Myotis daubentonii*, *M. mystacinus* sensu lato and *P. auritus*.



Figs 1-2. *Myotis alcathoe* hibernating in the cave Dolna w Nasicznem, Western Bieszczady (16 February 2011; Photo: K. SACHANOWICZ). **Fig. 3.** *Myotis alcathoe* hibernating in Senderki adits (25 March 2012; Photo: R. BIJAS and M. PISKORSKI). **Fig. 4.** Hibernating *Myotis alcathoe* in the mine "nad PKP II" Szklarska Poręba Dolna (15 January 2012; Photo: T. GOTTFRIED).

4. The abandoned mining adit "nad PKP II" (15°33′21′′E, 50°50′59′′N, 610 m a.s.l.), length ca. 200 m, in Szklarska Poręba Dolna, the Western Sudety Mts. The male (forearm length 31.5 mm), was found on 15 January 2012 (Fig. 4). The bat hibernated in shallow hollow of the wall, ca. 10 m from the entrance, ca. 1.3 m above the floor covered with water. Other species recorded: *M. myotis* and *M. daubentonii.*

These records indicate rather occasional winter use of underground roosts by the species (like in *M. bechsteinii*) and suggest it may hibernate also in other caves and mines across its geographic range in Poland, especially those where it was netted during swarming in the Carpathians, Sudety Mts. and Krakowska Upland. Because of insufficient data it is unclear whether it belongs to the group of strictly cave dwellers or may hibernate mainly in trees. Scarcity of winter observations may result from its exceptionally low detectability due to the lack of obvious characters allowing for discrimination of hibernating individuals from similar species, as well as constraints of winter bat censuses. *M. alcathoe* (particularly young individuals) are easy to confuse with *Myotis brandtii*, *M. mystacinus* and especially (because of its pinkish muzzle) with *M. daubentonii* (DIETZ et al. 2009; DANKO et al. 2010; SACHANOWICZ 2010). Because handling of all suspected *Myotis* bats at winter roosts to check diagnostic features is unjustified, most of such observations should be treated combined as representing a group of these species. However, recognition of adults of *M. alcathoe* seems possible in some cases, with the close-up view of the whole bat (e.g. hanging on the wall), especially accompanied by other species, allowing comparison of their size. Some features visible on figures 1-4 can be useful for discrimination. By its appearance and coloration pattern *M. alcathoe* closest resembles adults of *M. daubentonii* and *M. brandtii*, which however are larger. Small size, grayish-brown coloration (whitish fur on ventral side of the body may not be visible), short muzzle and ears make it even similar to bats of the genus *Pipistrellus*. Forearms and ears (outer side) are brown, similar in color to the fur on dorsal side of the body. Muzzle and proximal, inner part of the ears are pinkish, like in *M. daubentonii*. Feet, if visible, are smaller than in similar species (see Fig. 3).

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