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### Distribution and range expansion of Savi's bat (*Hypsugo savii*) in Austria

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The German name „Alpenfledermaus“ (alpine bat) goes back to BLASIUS (1857), who recorded this species between 1847 and 1852 from several sites in the Alps between Mont-blanc in the Swiss western Alps and Salzburg in the Austrian eastern Alps. This bat used to live in huts in high altitudes above the tree line. BLASIUS (1857) did not mention this species at lower elevations. 100 years later KAHMANN (1958) found a group of *Hypsugo savii* in a loft of a house in the small town of Mittenwald situated in the Bavarian Alps north of the main chain in 912 m altitude. While nowadays in Switzerland *Hypsugo savii* is found to be common in alpine valleys south of the Alps as well as in valleys climatically influenced by “föhn”-winds north of the Alps (ARLETTAZ and ZINGG 1995), KAHMANN'S (1958) record is the last evidence of a high altitude population of *H. savii* in the eastern Alps.

The alpine population of *H. savii*, described by BLASIUS (1857) to be rather common at high altitudes, was reported in 1988 by SPITZENBERGER and MAYER to be scarce or missing in Austria. The only recent Austrian record at that time was the finding of a female in a factory building in the town of Klagenfurt in January 1985. Klagenfurt, the capital of Carinthia, lies south of the main chain of the Alps at an altitude of  $\pm 450$  m above sea level. This winter record later proved to be the first sign of a resident population in Klagenfurt: On 18 July 1993 a single dead female and her offspring and in January 1994 another hibernating specimen were found in buildings in Klagenfurt (SPITZENBERGER 1995).

While there were still no new observations of this species in the Austrian Alps, in the following two years Savi's bat was recorded three times northeast of Klagenfurt at lower elevations: Probably 1995 (no exact date mentioned): one dead specimen in the castle of Klaffenau near Hartberg, Styria, 330 m above sea level. (FREITAG 1996).

16. Feb. 1995: one female in Vienna (9th district), 166 m above sea level.

25. Sept. 1996: one male in Vienna (9th district).

Dates and localisations in records of Savi's bat in Austria between 1994 and 1996 (Fig. 1) appear to indicate a short-termed expansion of this species northeastward, using a route around the southeastern margins of the Alps. From Klagenfurt in the Carinthian basin the species spread 150 km to the northeast (Hartberg) and appeared 110 km further north-northeast in Vienna in 1995. At the same time Kuhl's pipistrelle, a predominantly Mediterranean species, occurring also in semi-deserts of the Near East, spread in Austria to the northeast, apparently using the same route as *H. savii* (BAUER 1996). These two species of bats live together on the Adriatic islands (see for instance GAISLER 1994) and specimens of both species have been found as far from their normal ranges as England in recent times (GANTLETT 1993; FISHER 1996).



**Fig.1.** Historical (empty circles) and recent (full circles) distribution of Savi's bat (*Pipistrellus savii*) in Austria.

*Hypsugo savii* is a petrophilous paleo-xeromontane faunal element. In Middle Asia it is a typical bat of rocky mountainous areas (STRELKOV 1980). RYBIN et al. (1978) presumed *H. savii* to be present in all rocky regions of southern Kirghizia. They found a small colony at an altitude of 3 100 m above sea level. However in Kazakhstan it also inhabits lower elevations, where it occurs in huts of sheperds (STRELKOV and SHAIMARDANOV 1983). In Turkmenia it was also found in a large modern town (Ashkhabad) (STRELKOV et al. 1978). This adaptability to human habitats may have facilitated its expansion to the lowlands such as in the black redstart (BURTON 1995). This bird, originally confined to dry and warm rocky slopes of high mountains, began to spread to the plains of Germany and north into Denmark as well as to southern England in the middle of the last century (BURTON 1995). KNOPFLI (1971) believes, that the bird's ability to use human buildings instead of crevices in rocks was the main reason for its success in expanding into the lowlands and thereby extending its range.

In the southern parts of its European distribution *H. savii* ranges regularly from high to low altitudes. In Iberia it was found between 2 400 m and 150 m above sea level (IBANEZ et al. 1992); in the French-Swiss border region it occurs from 1 900 m (Col du Bretolet, Valais – ARLETTAZ and ZINGG 1995) to 200 m altitude (Saint Fons, S of Lyon in the Lower Rhone valley – ARIAGNO 1993). In the Swiss Bregaglia Valley (GR) it is distributed from 1 810 m to 320 m above sea level (ZINGG and MAURIZIO 1991) and on the Balkan Peninsula from 1 350 m (Kozuv mountains – MARTINO 1939 fide KRYŠTUFEK et al.1992) to sea level (several Adriatic islands – PETROVIĆ 1983).

As Austria's bat fauna is quite well studied, it can be ruled out that *H. savii* occurs here regularly from the low altitudes, where it has been found recently, to high mountain regions. It can be assumed, that the ancestral Alpine population that occurred in the eastern Alps during a climatically favourable period 150 years ago, has since become extinct. The recently expanding population is obviously an urban one and adapted to lower altitudes. Its origin may be looked for in northern Italy, where *H. savii* it is one of the most common inhabitants of towns (Padova, Treviso, Venezia, Verona – VERNIER 1996).

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