

Bat Diversity at Ikh Nart Nature Reserve, Mongolia

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Abstract

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Bats represent one of the least studied mammal groups in Mongolia, and little is known about the distribution and ecology of species in the country. We surveyed bats in Ikh Nart Nature Reserve, which lies at the intersection of two ecozones in Mongolia, to determine the species present and obtain preliminary data on habitat associations. We conducted mist net surveys at 9 sites, including 4 at natural springs, 2 at human-made wells, and 3 at sites without water, from June to August 2011. We captured 149 individuals representing 3 species, *Myotis aurascens*, *Eptesicus gobiensis*, and *Vespertilio* sp. One species, *E. gobiensis*, represents a new record for the reserve. We captured all three species at sites near natural springs, only one species, *M. aurascens*, at human-made well sites, and no bats at sites without water. We also collected basic morphometric measurements for *M. aurascens* and *E. gobiensis*. Analysis of morphometric measurements for *M. aurascens* indicated some sexual dimorphisms. Our results provide a baseline estimate of bats in Ikh Nart and suggest that bat diversity is greater than previously thought. Our results also validate the presence of *E. gobiensis* and suggest that the species we captured associate mainly with natural water sources.

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Introduction

Very little is known about the distribution and ecology of Mongolia's fourteen extant bat species (Dolch *et al.*, 2007; Nyambayar *et al.*, 2010). Biologists have surveyed bats in some parts of the country, including sites in Arhangai, Bayanhongor, Bulgan, Darhan-Uul, Dundgovi, Khovd, Huvsgul, Umnugovi, Uvurhangai, Selenge, Tuv, and Zavkhan aimags (Dolch *et al.*, 2007; Nyambayar

et al., 2010). Results of these surveys form the basis for current species distribution estimates (Clark *et al.*, 2006). Distribution maps have also been inferred from the distribution of potentially suitable habitats. However, details on the basic habitat associations of Mongolia's bats remain poorly studied, limiting inferences, effective management, and conservation planning.

Dornogobi Aimag (i.e., province) lies at the margin of two ecozones, steppe and semi-desert steppe (Mallon, 1985), making it an important area for assessing the ranges of species found in one or both ecozones. We surveyed bat species at a nature reserve in northern Dornogobi to estimate species presence and provide preliminary data on habitat associations. Past studies documented three bat species in the region, including *Myotis aurascens* (whiskered bat), *Vespertilio murinus* (particolored bat), and *Vespertilio superans* (Asian particolored bat) (Murdoch *et al.*, 2006), and we expected to record these species during our surveys. We also expected to find all bats associated with water, based on observations elsewhere in Mongolia (Dolch *et al.*, 2007; Batsaikhan *et al.*, 2010; Nyambayar *et al.*, 2010).

Materials and Methods

We surveyed bats in Ikh Nart Nature Reserve, Dornogobi Aimag, Mongolia (Reading *et al.*, 2011). Ikh Nart (45°43'N, 108°39'E) is a 666 km² protected area established in 1996 to protect a population of argali sheep (*Ovis ammon*) and the unique landscape of the region (Myagmarsuren, 2000). Topography is variable, consisting of open, gently rolling plains, rugged areas of rocky outcrops, and steep-sided drainages (Reading *et al.*, 2011). Grasses, forbs, and shrubs are the primary vegetation of the plains, while rocky areas and drainages often include trees (*Ulmus pumila*

and *Salix* sp.) (Jackson *et al.* 2006). Climate is arid, with <200 mm of annual precipitation, and variable, with temperatures ranging from -40°C to +40°C. Water sources are rare and highly localized, occurring as natural springs in some drainages and as human-made wells near herder camps.

We conducted 30 bat surveys across 9 net sites from 05 June to 09 August 2011. Net sites included permanent natural springs ($n = 4$ sites and 16 surveys), human-made wells ($n = 2$ sites and 8 surveys), and areas without water ($n = 3$ sites and 6 surveys) (Fig. 1). The spring and well sites included six prominent water sources documented by on-going research projects (Reading *et al.*, 2007). We randomly chose the sites without water. At each site, we erected a 2.5 x 11 m mist net with 20 x 20 mm mesh. Each survey involved opening the net from 20:00 to 23:00 (once until 0:00) to capture bats. We processed all bats on-site immediately after capture following guidelines of the American Society of Mammalogists (Sikes *et al.*, 2011) and methods recommended by Kunz *et al.* (2009). We recorded the species and sex of all captured bats and measured morphological characteristics, including mass, head-body, forearm, tail, ear, tragus, 3rd finger, and 5th finger length. We identified species based on descriptions in Batsaikhan *et al.* (2010).

We examined habitat associations by testing for differences in capture rates (# captured/hr/survey) for each species between the three site types. We

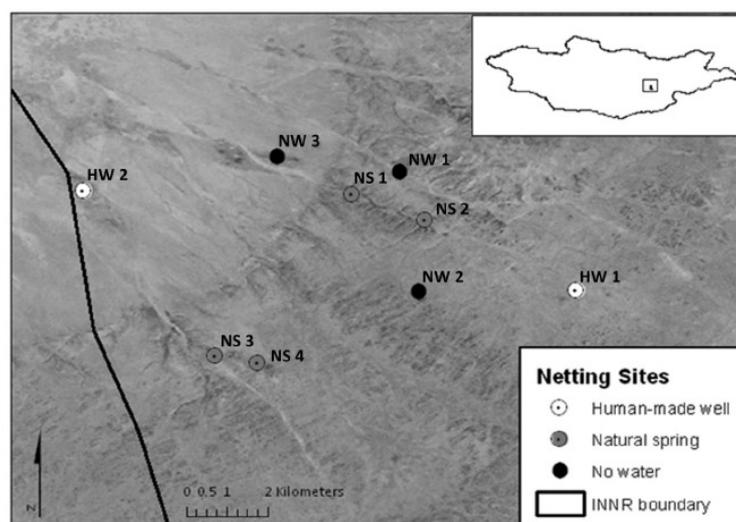


Figure 1. Bat mist netting sites in Ikh Nart Nature Reserve, Mongolia, from June to August 2011. We placed mist nets at 9 sites during 30 nights: 2 at human made wells (HW; white), 4 at natural springs (NS; gray), and 3 in areas without water (NW; black).