

# A GIS-based approach to assess the population size of Krüper's Nuthatch, *Sitta krueperi* at a newly found breeding area in Inner Anatolia

(Aves: Passeriformes)

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**Abstract.** A new breeding area for Krüper's Nuthatch (*Sitta krueperi* Pelzeln, 1863) was discovered in the Ak Mountains of Yozgat province of Inner Anatolia in pure Scots Pine (*Pinus silvestris*) woodland. The average bird density was  $1.23 \pm 0.85$  individuals/km<sup>2</sup>. The Habitat Suitability Index (HSI) was applied for altitude and habitat characteristics of Scots Pine within a raster of 500 x 500 m, and, based on this, a model distribution map was prepared using a Geographic Information System (GIS). Using a HSI-based threshold of more than 0.7 and the area of habitat, we calculated the population size of Krüper's Nuthatch in the Ak Mountains region as 558 individuals.

**Key words.** Turkey, GIS, habitat modelling, distribution modelling, Habitat Suitability Index.

## Introduction

Krüper's Nuthatch, *Sitta krueperi* Pelzeln, 1863, is a 'Near Threatened' species (IUCN 2006). Its distribution is confined to the coastal periphery of the Anatolian peninsula; limited numbers are also found on the adjacent Greek island of Lesbos and in the Caucasus region (HARRAP & QUINN 1996, HAGEMEIJER & BLAIR 1997, ALBAYRAK & ERDOĞAN 2005a, HOYO et al. 2008). Krüper's Nuthatch occurs only in coniferous forests, from sea level to the tree line (ALBAYRAK 2007). It is mostly sedentary with some post-breeding dispersal and seasonal altitudinal movements (HOYO et al. 2008).

Mapping the distribution of species is a key issue in ecology and conservation because hypotheses often rely on an accurate knowledge of where a species occurs (BROTONS et al. 2004b). Geographic information systems (GIS) are a useful software for predictive habitat distribution models, which are again very helpful in wildlife management (BROTONS et al. 2004a, MEGGS et al. 2004) and for estimating population size (GOTTSCHALK et al. 2007).

In this paper we estimate the distribution and density of Krüper's Nuthatch in a pure Scots Pine (*Pinus silvestris* L.) forest at a recently discovered breeding area, the Ak Mountains (Yozgat, Inner Anatolia). We specifically focus on the association between the birds and altitude, habitat structural variations, ages and density of the Scots Pine. Our study provides a base for determining the potential distribution of Krüper's Nuthatch in the Ak Mountains and other areas. Our aims are to illustrate and to discuss the new distribution area and also to predict the habitat distribution and calculate the total population size of Krüper's Nuthatch in the Ak Mountains.