

# Densities and mortalities of Skylark *Alauda arvensis* (Linnaeus, 1758) and Water pipit (*Anthus spinoletta*) (Linnaeus, 1758) in wind farms in mountainous habitats in northern Galicia (NW Spain)

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## Abstract

TAPIA, L. & FONTÁN, L. (2006). Densities and mortalities of Skylark *Alauda arvensis* (Linnaeus, 1758) and Water pipit (*Anthus spinoletta*) (Linnaeus, 1758) in wind farms in mountainous habitats in northern Galicia (NW Spain). *Nova Acta Científica Compostelana (Biología)*, **15**: 73-76

Between the spring of 2000 and winter of 2004, seasonal densities and the effect of wind farms on Skylark (*Alauda arvensis*) and Water pipit (*Anthus spinoletta*) were determined in mountainous areas in northern Galicia. The densities of the Skylark and Water pipit were between 5.9 birds/10 ha and 6.6 birds/10 ha respectively for the breeding period and between 2.1 birds /10 ha and 2.5 birds /10 ha respectively for the winter period. Only was detected a collision incidence for the Skylark of 0.007 birds/turbine/year.

**Keywords:** *Alauda arvensis*, *Anthus spinoletta*, Skylark, Water pipit, wind farms, Galicia.

## Resumen

TAPIA, L. & FONTÁN, L. (2006). Densidades y mortalidades de Alondra común *Alauda arvensis* (Linnaeus, 1758) y Bisbita alpino (*Anthus spinoletta*) (Linnaeus, 1758) en parques eólicos en hábitats de montaña en el norte de Galicia. *Nova Acta Científica Compostelana (Biología)*, **15**: 73-76

Entre la primavera de 2000 y el invierno de 2004 se evaluaron las densidades estacionales de Alondra común (*Alauda arvensis*) y Bisbita alpino (*Anthus spinoletta*) en áreas montanas del norte de Galicia así como la incidencia de los parques eólicos presentes sobre estas dos especies. Las densidades obtenidas para Alondra común y Bisbita alpino oscilaron respectivamente entre 5,9 aves/10 ha y 6,6 aves/10 ha para el período reproductivo y 2,1 aves /10 ha y 2,5 aves /10 ha para el período invernal, detectándose índice de colisión, sólo para la Alondra común, de 0,007 aves/aerogenerador/año.

**Palabras clave:** *Alauda arvensis*, Alondra común, *Anthus spinoletta*, Bisbita alpino, parques eólicos, Galicia.

## INTRODUCTION

Potential environmental impacts that wind farms cause on wildlife include collision mortality, displacement due to disturbance, barrier effects, and habitat change and loss (BIRDLIFE, 2002; BARRIOS & RODRÍGUEZ, 2004; DE LUCAS *et al.*, 2004; DREWITT & LANGSTON, 2006). The wind farm industry is presently undergoing intensive development in some mountainous regions of Galicia, and this is often carried out in areas that are suitable habitats for birds. This is the case of Skylark (*Alauda arvensis*) and the Water pipit (*Anthus spinoletta*) (GONZÁLEZ-OREJA, 2003), which commonly occur in open habitats of mountainous areas in the north of the Iberian Peninsula, with maximum densities in these habitats of 9 birds/10 ha and 2 birds/10 ha respectively (PURROY, 2003; VÁZQUEZ-PUMARIÑO, 2003). The objective of this study was to obtain densities and mortalities of both species in wind farms in mountainous habitats in northern Galicia (NW Spain).

## MATERIAL AND METHODS

The study area comprises 22,564 ha, and is designated as the Serra do Xistral Site of Community Importance (SCI). It is a mountainous area of medium altitude located in the north of the Province of Lugo (Galicia, NW Spain). The maximum altitude is 1,056 m.a.s.l. The lithology is mainly constituted by granite rocks, being very important the presence of Active Raised Bogs in the area. The climate in the area is oceanic, with a mean annual precipitation that ranges between 1,400 and 1,800 mm. The habitats of greater importance for the birds are Atlantic heathlands (*Erica* sp., *Calluna* sp.) and grasslands (*Lolium* sp., *Dactylis* sp.). The temperate deciduous forests are mixed formations (*Quercus* sp., *Betula* sp., etc.) and coniferous forests (*Pinus* sp.). There are some human settlements in the surrounding valleys, but they are generally scarce and widely dispersed and are absent from the highest areas where wind farms are being installed. Bird

censuses were carried out during the period of study, between spring 2000 and winter of 2004, to obtain the densities of both species during the breeding period (April-July) (n = 34) and during winter (December-February) (n = 19). The technique of birds census used was the Finish Transect with a band of 25 m (TELLERÍA, 1986; BIBBY *et al.*, 1992). The transects (total 11) were established in areas >600 m.a.s.l. where alignments of wind turbines are located, and which are dominated by heathlands and grasslands. The length of each transect was 1,500 m and each was monitored 3 times in the same day. To estimate bird fatalities at the wind farms under study, all of the wind turbines (total 283), were revised every two months during the period of study. The field survey methodology is described by GARCÍA-ARRESE *et al.* (2003).

## RESULTS AND DISCUSSION

The densities obtained for the Skylark and Water pipit were between  $5.9 \pm 1.8$  birds /10 ha and  $6.6 \pm 1.4$  /10 ha (mean  $\pm$  s.e.) respectively for the breeding period and between  $2.1 \pm 0.8$  birds /10 ha and  $2.5 \pm 1.4$  birds /10 ha for the winter period. These densities could be high for the Water pipit in the context of the Iberian Peninsula, and also for Skylark reported in these type of habitats (BARBIER, 2001; PURROY, 2003; VÁZQUEZ-PUMARIÑO, 2003). During the winter the densities of both species decreased notably, possibly due to the hard environmental conditions and the shortage of food resources in the area (FONTÁN & TAPIA, 2003). As regards the direct incidence of collision with turbines, no Water pipit carcasses and only 2 Skylark carcasses were found, both in the winter of 2002, which amounts to an index of collision of 0.007 birds/turbine/year for this species. The data suggest the non-existence of direct collisions by Water pipit and a low incidence in the case of the Skylark. Nevertheless, experiments are being done at present to evaluate the persistence of bird carcasses in the wind farms areas, as well as the abundance of scavengers, and preliminary results indicate

possible underestimation of the true impacts of wind farms and other utility structures on birds (FERRER & JANSS, 1999; AZUL, 2003). For this reason, the data regarding the direct incidence of collisions must be considered carefully.

Although there are no available data for the densities of the analyzed species in previous periods to installation of the wind farms in the study area, we believe that the habitat of the Water pipit may have been improved as there is a larger surface area of herbaceous vegetation around the wind turbines and on the banks of the tracks, which are heavily used by the species for searching for food. On the contrary, because of the predilection of the Skylark for low scrubs cover in mountainous habitats (GONZÁLEZ-OREJA, 2003), the installation of the wind farms may cause partial destruction of its habitat; this destruction may be more intense in some areas in relation to over-grazing by livestock. However, the existence of extensive livestock in the area may have a positive effect on the habitats of these species (TUCKER & EVANS, 1997; LAIOLO *et al.*, 2004). We consider it very important to continue monitoring the changes in population densities of both species and to evaluate bird mortality in the wind farms, taking into account the potential biases in removal rates mentioned above, and the possibility of using correction factors (FERRER & JANSS, 1999). Studies of synergic and cumulative effects will be important (TAPIA *et al.*, 2005), as these will allow evaluation of the real effects of loss of bird habitat that the existing wind farms and future installations may cause in the area.

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