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SEXUAL DIMORPHISM IN AN INSULAR SOUTHERN GREY SHRIKE SUBSPECIES *LANIUS MERIDIONALIS KOENIGI*

DIMORFISMO SEXUAL EN LA SUBESPECIE INSULAR DE ALCAUDÓN REAL *LANIUS MERIDIONALIS KOENIGI*

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Biometric features have been used to identify subspecies in passerines in order to check size changes with latitude (Ashton, 2002) or sexual dimorphism in size (Bibby and Thomas, 1984; Campos *et al*., 2005). Sexual dimorphism may bring some light on the feeding strategies in males and females (Bibby and Thomas, 1984; Campos *et al*., 2005) and on assortative mating (Tryjanowski and Simek, 2005; Haggerty, 2006; Moreno-Rueda, 2006). Sexual differentiation would be essential when wintering survival or breeding strategies are being developed. In that context, the knowledge of sexes in studies focused on bird population management and conservation would be important (McGregor and Peake, 1998).

On the other hand, *L. m. koenigi* is a subspecies of southern grey shrike *Lanius meridionalis*, a polytypic species with a broad geographical distribution (Lefranc and Worfolk, 1997). *L. m. koenigi* is restricted to four of the seven Canary Islands (Martín and Lorenzo, 2001), and only some aspects of its ecology are known (Nogales *et al*., 1998; Padilla *et al.*, 2005) and something of its biometrics, based on 29 samples kept in skin (Cramp and Perrins, 1993). To date, no biometrical data have been published on living birds. According to the IUCN categories for threatened birds, this subspecies is catalogued as Deficient (Hernández and Infante, 2005), on account of which more information is needed. The aim of this paper is to increase the knowledge of its biometrics in living birds and of known sex, so that a tool may be used to investigate its ecology and to allow its preservation.

Fieldwork was carried out in Fuerteventura inland (Canary Islands, 20º30' N, 13º53' W). The climate is xeric (annual mean temperature: 19.1 ºC; annual mean rainfall < 200 mm; Marzol-Jaén, 1984). The vegetation consists of xerophytic shrub, mainly *Launaea arborescens*, *Salsola vermiculata* and *Lycium intricatum*.

In January and February 2001, 61shrikes were caught with a variant of potter trap (Craig, 1997). All birds were ringed to individualize them and the following biometrical measurements were taken from each one according to Svensson (1996):

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1) Lengths of wing (maximum chord), third primary (3P) and tail, white on the primaries (WP), and white on the rectrices (WR) with a 0.5 mm precision ruler as described by Collister and Wicklum (1996).
2) Length of tarsus and bill length, depth and width, were measured with a 0.1 mm precision caliper.
3) Birds were weighed using a 0.1 g precision balance.

Their sex was determined by molecular techniques from blood obtained by brachial venipuncture, according to the protocols of Griffiths *et al*. (1998) and Gutiérrez-Corchero *et al*. (2002).

The variables in this analysis were all normally distributed (Kolmogorov-Smirnoff test). Means are shown ± SE and their values were compared with Student *t*-test. All statistical analyses were carried out using SPSS version 7.5.

Significant differences between sexes were observed for some measurements. Males were significantly larger than females in wing length, 3P, WP, WR, tail and bill depth (Table 1). However, there was an important overlap between the measurements in the sexes. On the contrary, there were no significant differences between sexes in bill length and bill width, tarsus, middle toe and body mass (Table 1).

Results indicate that there is sexual dimorphism in size in this subspecies, a fact which has been recorded in other shrikes species too, like brown shrike *Lanius cristatus* (Takagi, 1996), red-backed shrike *Lanius collurio* (Tryjanowski and Simek, 2005), loggerhead shrike *Lanius ludovicianus* (Collister and Wicklum, 1996) and southern grey shrike (Gutiérrez-Corchero *et al*., 2006). In the last species, Gutiérrez-Corchero *et al*. (2006) recorded that males of the nominate subspecies *L. m. meridionalis* were significantly larger than females in some measurements, and suggested trophic segregation between sexes and sexual selection as possible causes of this dimorphism. In *L. m. koenigi* data from the present work show a similar situation to that of the nominate subspecies, and therefore the same causes would be an adequate explanation.

In addition, biometrics may be another criterion to be taken into account in order to clarify the taxonomic situation of southern grey shrike, which is still being argued (see Hernández *et al*., 2004). A recent biometric study has remarked a greater similarity of southern grey shrike with loggerhead shrike than great grey shrike (Gutiérrez-Corchero *et al*., 2006). In a similar way, the comparison between biometric data and subspecies of southern grey shrike might shed some light on the differences and similarities among them, and hence, on its taxonomic position. More investigation is needed in order to clarify this point.

RESUMEN.—*La biometría del alcaudón real en Fuerteventura, islas Canarias (subespecie* Lanius meridionalis koenigi*) fue analizada en 61 aves vivas (44 machos, 17 hembras). Los machos fueron mayores que las hembras en longitud de ala, tercera primaria, cola, extensión de la mancha blanca en primarias y en rectrices, y en altura del pico. Por el contrario, la longitud de tarso, dedo medio y longitud y anchura del pico, así como la masa corporal no difirieron significativamente entre sexos. Se sugiere que este dimorfismo sexual puede estar relacionado con la selección sexual y con la segregación trófica entre sexos.*

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TABLE 1

Average ± SD (range of values; sample size) of variables in males and females of *L. m. koenigi* (lengths in mm, body mass in g). 3P: third primary. WP: white on primaries. WR: white on rectrices. **P* < 0.05, ***P* < 0.01, ****P* < 0.001, ns: not significant.
[Valores medios ± desviación típica (rango de valores; tamaño de muestra) de las variables medidas en machos y hembras de la subespecie L. m. koenigi*. 3P: tercera primaria. WR: blanco en las rectrices. WP: blanco en las primarias.]*

	Males *[Machos]*	**Females** *[Hembras]*	***t*-test**
Wing	99.26 ± 1.55	96.97 ± 2.58	3.41 **
[Ala]	(96.0-103.0; 44)	(92.0-102.0; 17)	
3P	75.46 ± 1.58	73.47 ± 2.18	3.95 ***
	(71.0-78.5; 44)	(69.0-77.0; 17)	
WP	57.83 ± 2.24	54.91 ± 2.26	4.54 ***
	(52.0-64.0; 44)	(51.5-59.0; 17)	
WR	51.85 ± 5.04	45.93 ± 3.82	4.19 ***
	(40.5-60.0; 38)	(40.0-53.0; 16)	
Tail	106.33 ± 3.24	102.67 ± 3.31	3.92 ***
[Cola]	(100.0-113.0; 44)	(97.0-109.0; 17)	
Bill length	13.44 ± 0.63	13.30 ± 0.66	0.78 ns
[Longitud del pico]	(12.2-14.6; 44)	(12.0-13.4; 17)	
Bill depth	9.07 ± 0.25	8.81 ± 0.22	3.67 *
[Altura del pico]	(8.5-9.8; 44)	(8.4-9.3; 17)	
Bill width	7.05 ± 0.20	7.05 ± 0.26	0.05 ns
[Anchura del pico]	(6.5-7.4; 44)	(6.6-7.5; 17)	
Tarsus	29.82 ± 0.88	29.66 ± 0.78	0.68 ns
[Tarso]	(27.2-31.6; 44)	(27.9-31.1; 17)	
Middle toe	21.17 ± 0.72	20.92 ± 0.36	1.76 ns
[Dedo medio]	(19.6-22.8; 44)	(20.1-21.3; 17)	
Body mass	56.18 ± 2.47	57.08 ± 4.62	0.76 ns
[Masa corporal]	(51.0-62.0; 44)	(49.0-64.5)	

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