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Insect ectoparasites of the Red-backed Shrike *Lanius collurio* in the Iberian Peninsula

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Abstract Of the 26 Red-backed Shrike *(Lanius collurio)* sampled with the aim of characterizing insect ectoparasites, five birds were parasitized by louse flies. Two species were identified, *Ornithophila metallica* and *Ornithomya fringillina*. The first species is reported for the first time in the Red-backed Shrike, and the second represents a new host association in the Iberian Peninsula.

Keywords: bird, louse flies, *Ornithophila*, *Ornithomya*, passerine, Spain

Összefoglalás A megvizsgált 26 tövisszúró gébics *(Lanius collurio)* közül öt volt kullancsléggyel parazitálva. Ezek két fajhoz *(Ornithophila metallica, Ornithomya fringillina)* tartoztak. Az első fajt először mutatták ki tövisszúró gébicsen, a második fajjal alkotott parazita-gazda kapcsolat pedig az Ibériai-félszigeten először bukkant fel.

Kulcsszavak: madár, kullancslégy, *Ornithophila*, *Ornithomya*, énekesmadarak, Spanyolország

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Introduction

The Red-backed Shrike *Lanius collurio* is a long-distance migratory songbird widely distributed in the Palearctic and the Afrotropical regions. During the breeding season, it is distributed on extent areas of Europe and Central Asia. Often linked to the semi-open habitats of the Eurosiberian region during the breeding season, it occupies mountain fresh areas with lower summer dryness in the Mediterranean region. It winters on the semiarid savanna areas of the southeast of Africa (Bruderer & Bruderer 1993, Lefranc & Workfolk 1997, Shirihai & Svensson 2018).

In the Iberian Peninsula, the Red-backed Shrike is distributed from the Pyrenees to the Cantabrian Mountains, Galicia, North Portugal, and the northern Iberian system. In recent decades, it has colonized the freshest areas of the Meridional Iberian System and Central System Mountains (Hidalgo *et al.* 2020, Tellería *et al.* 2020). This distribution range expansion into new Mediterranean areas cannot hide its global population trends. In the north and west Europa has been documented a population regression of 38% over the last 30-40 years. The breeding population in Iberia decreased by 54% between 1998 and 2016, reaching to 95% reduction in the Eurosiberian region at the northern Iberian Peninsula (Escandell 2017, Tellería 2018).

Due to declining populations, the Red-backed Shrike is protected in European countries and also by international organizations (BirdLife International 2017). From a conservational point of view, it is important to know the community of their ectoparasites, since ectoparasites can negatively impact the health status of bird populations and transmit microbial infections (Owen *et al.* 2010). In the Red-backed Shrike, ectoparasites representing three orders of insects have been detected in the Palearctic regions: flies, lice, and fleas (Diptera, Phthiraptera and Siphonaptera).

Brueelia cruciata and *Philopterus coarctatus* (suborder Ischnocera) have been cited in Central and Eastern Europe (Hellenthal *et al*. 2004, Costică 2007, Ilieva 2009, Vas *et al*. 2012a, 2012b, Dik *et al*. 2017). From Amblycera, the genus *Myrsidea* in Bulgaria (Ilieva 2009), *Menacanthus eurysternus* and *M. camelinus* in Central Eastern Europe region (Hellenthal *et al*. 2004, Costică 2007, Ilieva 2009, Vas *et al*. 2012a, 2012b).

Three species of fleas (Siphonaptera), *Ceratophyllus garei*, *C. borealis* and *C. gallinae* have been cited of the Red-backed Shrike in Central Europe (Kristofík *et al*. 2002). Three species of louse flies (Diptera: Hippoboscidae) have been recorder until now, *Ornithoica turdi* in Croatia (Trilar & Krčmar 2005), *Ornithomya avicularia* and *O. fringillina* in Central Europe (Sychra *et al*. 2008, Oboňa *et al.* 2019a).

Currently, there are no studies of insect ectoparasites of the Red-backed Shrike in the Iberian Peninsula (Tellería *et al*. 2020). The lack of information encourages us to explore the insect ectoparasite fauna of the Red-backed Shrike in Spain.

Materials and Methods

The study has been carried out at two ringing stations (Collado Cerrado [40º 52' N, 03º 45' O] and Arroyo de la Laguna [41º 09' N, 03º 36' O], Madrid, Spain). These ringing sites are located on mountain passes between 1.480 to 1.530 m a.s.l., both covered by cattle pasturelands *(Festuca indigesta, Nardus stricta)* with scattered thorny bushes (*Rosa* sp.) and creeping juniper *(Juniperus communis nana)*, surrounded by brooms *(Cytisus oromediterraneus)* and Scots Pine *(Pinus sylvestris)*. As in other mountains in the Mediterranean basin, this habitat heterogeneity results in a high biological richness during the breeding season on relatively small areas (Lewis 1970, Myers *et al.* 2000).

Shrikes were captured from May to August 2021 using mist nets. All shrikes were placed individually into a single-use cotton bags to avoid mixing ectoparasites among birds. Louse flies were collected directly from the shrikes and stored in capped tubes containing 70% ethanol until their identification in laboratory. For each identified specimen, we recorded the taxon, collection date and site, collector and person who identified it. The louse fly specimens were identified to species under a stereo microscope. To avoid biases in these determinations, all specimens were identified and classified by the same researcher (I. Bernal). Nomenclature of louse flies follows Hutson (1984).

Shrikes were aged and sexed according to Svensson (2009). Descriptive statistics were computed using Quantitative Parasitology on the Web, while confidence intervals (CI) were calculated according to Sterne (Reiczigel *et al*. 2019).

Results

Out of 26 individual Red-backed Shrike captured, five birds were infested with louse flies (prevalence = 19.2%; CI (Stearns) = 6.6–39.4%). We did not detect other orders of insect ectoparasites mentioned above (Phthiraptera and Siphonaptera). In one of the shrikes, it was not possible to collect sample. All the infested shrikes carried a single fly specimen. Two species of louse flies were identified, *Ornithophila metallica* and *Ornithomya fringillina (Figure 1)*.

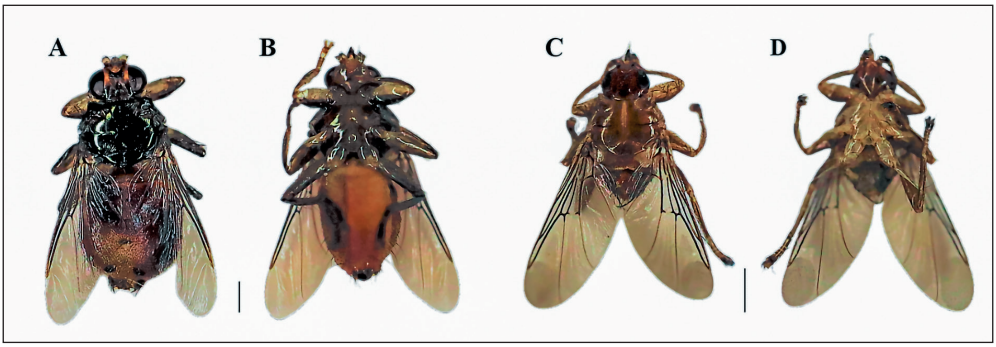

Figure 1. A and B – *Ornithophila metallica*, habitus, C and D – *Ornithomya fringillina*, habitus. A and C – dorsal view, B and D – ventral view. Unit scale: 1 mm

1. ábra A és B – *Ornithophila metallica*, C és D *Ornithomya fringillina*, A és C – háti nézet, B és D – hasi nézet, méretegység: 1 mm

***Ornithophila metallica* Schiner, 1864**

Material examined: 1 ♂ ex *Lanius collurio* (first calendar year), 16.VII. 2021.

***Ornithomya fringillina* Curtis, 1836**

Material examined: 1 ♀ ex *Lanius collurio* (first calendar year), 24.VII. 2021; 1 ♂ ex *Lanius collurio* (first calendar year), 24.VII. 2021; 1 ♂ ex *Lanius collurio* (adult female), 24. VII. 2021.

The samples were collected of the same family of shrike, from two first calendar year bird and one adult female.

Discussion

Two genera of louse flies (*Ornithophila* and *Ornithomya*) have been recorded from the Red-backed Shrike.

Ornithophila metallica is a polyxenous species distributed across the southern parts of the Palearctic, Afrotropical, Oriental and Australasian regions. In Europe, their records represent introductions by migratory birds (Nartshuk & Matyukhin 2019, Oboňa *et al.* 2019b, Gaponov & Tewelde 2020). Previously, *O. metallica* had been recorded in another species of the *Lanius* genus in Tajikistan (Red-tailed Shrike *Lanius phoenicuroides*, in Nartshuk & Matyukhin 2019). In the Iberian Peninsula, *O. metallica* has been recorded in raptors, cuckoos and passerines

(Cordero del Campillo *et al.* 1994, Carles-Tolrá 1998, 2001, Talabante *et al.* 2019). Therefore, our results represent the first host record of Red-backed Shrike.

Furthermore, we add a new host association for the Iberian Peninsula with the first record of *Ornithomya fringillina* on the Red-backed Shrike. This louse fly is a polyxenous species distributed around the Palearctic and Nearctic regions (Oboňa *et al.* 2019b, Gaponov & Tewelde 2020). *O. fringillina* is restricted more by habitat than by host specificity, preferring relatively lower areas with closed vegetation (Hutson 1984). This association had previously been documented in 25 Red-backed Shrikes (prevalence 100%) in Slovakia (Oboňa *et al.* 2019a). However, in the Iberian Peninsula this fly only has been cited in Barn Swallow *Hirundo rustica* and Common House Martin *Delichon urbicum* (Cordero del Campillo *et al.* 1994).

The confirmed presence of *O. metallica* in specimens of Red-backed Shrike is the first record of this species from this host. The long-distance migratory movements of this host across Europe and Africa makes this species an interesting host to detect new species of ectoparasites previously not recognized.

Knowledge of the ectoparasites of migratory birds, such as the Red-backed Shrike, can increase the documented species richness of a region, as well as improve our understanding of these species.

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