

CHEWING LICE (*Phthiraptera*) FROM CRESTED CARACARA (*Caracara plancus*, *Falconidae*) IN SOUTHERN BRAZIL

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ABSTRACT

This study was carried out to detect chewing lice species occurring on Crested Caracara (*Caracara plancus*) in Southern Brazil between January 2014 and December 2018. For this aim, the road-kill birds were collected for parasitological studies at the Biology Institute, Department of Microbiology and Parasitology of the Federal University of Pelotas. Fourteen road-kill birds were examined for ectoparasites. The birds were washed with water and detergent for the collection of ectoparasites by filtration using a 150 µm mesh sieve. The samples were separated into pellet and supernatant and were kept in microcentrifuge tubes containing ethyl alcohol 70% for the screening procedures and identification. A total of 794 specimens of lice were collected and examined, presenting the following breakdown by *Amblycera* suborder: *Colpocephalum flavescens* (753/94.84%), *Laemobothrion vulturis* (9/1.13%), and *Ischnocera* suborder: *Caracarcicola chimangophilus* (30/3.78%) and *Lipeurus* sp. (2/0.25%). It was found that all the caracara examined were parasitized by one or more species of *Phthiraptera*, with multiple or moderate level of infestation (101 to 1,000 lice/birds). *C. flavescens* was the most frequent and abundant species with 100% of the birds parasitized and an average of 53,7 lice/birds.

Keywords: *Caracara plancus*. *Phthiraptera*. Ectoparasites.

INTRODUCTION

Crested Caracara (*Caracara plancus*) is a unique raptor/scavenger in the *Falconidae* family (MORRISON, 2006). It is found from the Southern USA to Tierra del Fuego in open spaces, such as grasslands, savannas, pastures, cultivated fields, swamplands, road edges, highways, cities, and rural areas. In South America, the habitat of Crested Caracara has expanded along with the increase of human activities, due to a marked synanthropic behavior including nesting on human structures showing behavioral plasticity and described as dietary opportunists. At the same time, trees in this part of Southern Brazil have been typically removed from fields, they are found scattered along the roadside (DEL HOYO et al., 1994; GOLDSTEIN, 2000; PALMER, 1988; SIGRIST, 2006).

According to several studies, the most common causes of morbidity in these birds are infectious and parasitic diseases, toxicosis and metabolic, nutritional diseases, or traumatic injuries (ANDERY et al., 2013). Road kills are amongst the major cause of traumatic injuries probably due to raptor movement seeking food, mostly mammals and birds previously get hit on the highways (ANDERY et al., 2013). Road and highway construction affect wildlife through the direct loss and fragmentation of habitat, by introducing a source of additive mortality for wildlife populations, and by disrupting animal movement and dispersal. Traditionally, highway impacts on wildlife have been viewed in terms of road mortality and threats to selected populations of animals. Viewing this issue from a landscape ecology perspective, it is clear that highways have the potential to undermine ecological processes through the fragmentation of wildlife populations, and restriction of wildlife movements (ANDREWS, 1990; DE SANTO; SMITH, 1993).

Among the diversity of parasites that can be found in wild birds, the chewing lice (*Insecta: Phthiraptera*) stand out, and together with the feather mites (*Acari: Acaridida*), are the most often found ectoparasites (ANDERY et al., 2013; VALIM et al., 2005). The birds are parasitized by lice of two (*Amblycera* and *Ischnocera*) of the four sub-orders of *Phthiraptera*. *Ischnocera* live mainly in the feathers of their host and *Amblycera* live on the skin and body surface of the host; both showing high degree of specificity to a single species or a close group of hosts (VALIM et al., 2005). Although raptors infested with ectoparasites may show

no clinical signs, severe infestation mainly by lice may cause ragged looking feathers and self-inflicted trauma; furthermore, some ectoparasites are vectors of several pathogens of rapine birds (FREITAS et al., 2002; MORISHITA et al., 2001). Veterinarians and wildlife rehabilitators frequently admit free-living raptor into their clinics or rehabilitation centers. Incoming birds require to be screened for external parasites, and infested birds can be rapidly treated.

Numerous species of lice (*Phthiraptera*) have been found on raptors. Bird lice have an obligatory and entire life cycle on the host and their host specificity is restricted to one or a few host species (DALE; DROWN, 2001). At sense, this study was carried out to document chewing lice of *C. plancus* killed by running over on the highways of Southern Brazil.

MATERIAL AND METHODS

Between January 2014 and December 2018, fourteen road-kill birds were collected for parasitological studies along two federal highways (Brazilian federal highways - BR 116 and BR 392) in Southern Brazil. This study was authorized by Brazilian National Environmental Agency number 28810-1. Each bird was packed in a plastic bag and carried to the Biology Institute, Department of Microbiology and Parasitology of the Federal University of Pelotas in up to six hours. For the ectoparasites collection, the birds were kept in water with a detergent solution for about 30 minutes for unfixing the parasites. The ectoparasites were fixed in 70% alcohol, clarified with 10% potassium hydroxide and mounted between a slide and a cover slip with organic Canada balsam. The identification of lice was performed according to specific bibliography (CLAY, 1950; MELO et al., 2012; PRICE et al., 2003). The parameters analyzed (prevalence, mean intensity, and mean abundance) were calculated according to Bush et al. (1997). The representative specimens were deposited on the parasitological collection of the Department of Microbiology and Parasitology of the Federal University of Pelotas.

RESULTS AND DISCUSSION

Roadkills are amongst the most significant biodiversity impacts, although little is known about the factors that influence the roadkill of neotropical birds. Raptors harbor a variety of ectoparasites and the majority of them are host specific. In spite of increased number of

investigations about lice fauna found on bird species, the numbers of investigated wild bird and reported lice species are still insufficient in Brazil, especially in raptor/scavenger (ROSA; BAGER, 2012).

This study demonstrated that a high prevalence rate of *Phthiraptera* was found in fourteen birds (100%) with 794 specimens of chewing lice (Table 1). A total of 794 specimens of lice were collected and examined, presenting the following breakdown by *Amblycera* suborder: *Colpocephalum flavescens* (753/94.84%), *Laemobothrion vulturis* (9/1.13%), and *Ischnocera* suborder: *Caracaricola chimangophilus* (30/3.78%) and *Lipeurus* sp. (2/0.25%). Chewing lice are the most prevalent ectoparasites of raptors (MORISHITA et al., 2001) and in this study the prevalence was high (100%). This suggests that this parasitism may have weakened birds, impairing their ability to escape and more easily being hit by a car. This high prevalence disagrees with the data obtained by Pérez-Jiménez et al. (1988) in Spain (42%) and Morishita et al. (2001) in the United States (34.3%) from captive animals, probably because the raptors received some treatment in rehabilitation centers. Differently, here just wild animals were studied.

Table 1 - Chewing lice (*Phthiraptera*) from *Caracara plancus* in Southern Brazil.

Specie	P%	MA	MI
<i>Colpocephalum flavescens</i>	100	53.78	53.78
<i>Caracaricola chimangophilus</i>	85.7	2.1	2.5
<i>Laemobothrion vulturis</i>	35.7	0.64	1.8
<i>Lipeurus</i> sp.	14.2	0.14	1.0

P=Prevalence; MA=Mean Abundance; MI=Mean Intensity.

Among the diversity of parasites that can be found in wild birds, the chewing lice (*Insecta: Phthiraptera*) stand out, and together with the feather mites (*Acari: Acaridida*) are the most often found ectoparasites (VALIM et al., 2005). The birds are parasitized by lice of two (*Amblycera* and *Ischnocera*) of the four sub-orders of *Phthiraptera*. *Ischnocera* live mainly in the feathers of their host and *Amblycera* live on the skin and body surface of the host; both showing high degree of specificity to a single species or a close group of hosts (CLAY, 1950).

CONCLUSION

The examined *Caracara plancus* were parasitized by lice of the sub-orders *Amblycera* and *Ischnocera*, with high occurrence rate (100%). Routine sampling of malophages in apprehended birds or captive may provide a better understanding of the diversity of *Phthiraptera* fauna in the region, due to the difficulty in capturing material in nature.

PIOLHOS MASTIGADORES (*Phthiraptera*) EM CARCARÁ (*Caracara plancus*, *Falconidae*) NO SUL DO BRASIL

RESUMO

Este estudo foi realizado para detectar a ocorrência de espécies de piolhos mastigadores em carcará (*Caracara plancus*) no sul do Brasil, entre janeiro de 2014 e dezembro de 2018. Para tanto, aves atropeladas desta espécie foram coletadas para estudos parasitológicos no Instituto de Biologia, Departamento de Microbiologia e Parasitologia da Universidade Federal de Pelotas. Quatorze aves atropeladas foram coletadas e examinadas para presença de ectoparasitos. As aves foram lavadas com água e detergente para a coleta de ectoparasitos por filtração, utilizando peneira de malha de 150 µm. As amostras foram separadas em *pellet* e sobrenadante, e preservadas em microtubos contendo álcool etílico 70% para os procedimentos de seleção e identificação. Um total de 794 espécimes de piolhos foram coletados e examinados apresentando a seguinte frequência para subordem *Amblycera*: *Colpocephalum flavescens* (753/94,84%), *Laemobothrion vulturis* (9/1,13%) e subordem *Ischnocera*: *Caracanicola chimangophilus* (30/3,78%) e *Lipeurus* sp. (2/0,25%). Verificou-se que todos os carcarás examinados estavam parasitados por uma ou mais espécies de *Phthiraptera*, sendo o nível múltiplo e moderado de infestação (101 a 1.000 piolhos/aves) sendo *C. flavescens* a espécie mais frequente e abundante com 100% das aves parasitadas e uma média de 53,7 piolhos/aves.

Palavras-chave: *Caracara plancus*. *Phthiraptera*. Ectoparasitos.

PIOJOS MASTICADORES (*Phthiraptera*) EN CARACARÁ (*Caracara plancus*, *Falconidae*) EN EL SUR DE BRASIL

RESUMEN

Este estudio fue realizado para detectar la presencia de especies de piojos masticadores en caracará (*Caracara plancus*) en el sur de Brasil entre enero de 2014 y diciembre de 2018. Aves atropelladas de esta especie fueron recolectadas para estudios parasitológicos en el Instituto de Biología, Departamento de Microbiología y Parasitología de la Universidad Federal de Pelotas. Catorce aves atropelladas fueron recogidas y examinadas para evaluar la presencia de ectoparásitos. Las aves fueron lavadas con agua y detergente para la recolección de ectoparásitos por filtración, utilizando tamiz de malla de 150 µm. Posteriormente se separó el pellet y el sobrenadante, los cuales se preservaron en microtubos conteniendo alcohol etílico al 70% para los procedimientos de cribado e identificación. Se obtuvieron un total de 794 especímenes de piojos, presentando la siguiente frecuencia. Para el suborden *Amblycera*: *Colpocephalum flavescens* (753/94,84%), *Laemobothrion vulturis* (9/1,13%) y suborden *Ischnocera*: *Caracanicola chimangophilus* (30/3,78%) y *Lipeurus* sp. (2/0,25%). Se verificó que todos los caracarás examinados estaban parasitados por una o más especies de *Phthiraptera*, siendo el nivel múltiple y moderado de infestación (101 a 1.000 piojos/aves). *C. flavescens* fue la especie más frecuente y abundante con el 100% aves parasitadas y una media de 53,7 piojos/aves.

Palabras clave: *Caracara plancus*. *Phthiraptera*. Ectoparásitos.

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