

First report of one ecto- and two endoparasite species of the black stork (*Ciconia nigra*) in Portugal

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Short report

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Abstract

Background

The black stork (*Ciconia nigra* Linnaeus, 1758) is a recognized endangered species in Europe and most of the specimens from the Western Palearctic region breed in the Iberian Peninsula. Available works regarding parasites in black storks are scarce.

Methods

A black stork was captured in southern Portugal after colliding against electric cables. The specimen did not resist to injuries and a post-mortem exam was performed. During the procedure, several ecto- and endoparasites were found.

Results

The collected parasites were lice (*Neophiloater tricolor*), nematodes (*Desportesius sagittatus*) and trematodes (*Cathaemasia hians*).

Conclusions

Three different parasite species are reported for the first time in a black stork from Portugal.

Background

The black stork (*Ciconia nigra* Linnaeus, 1758) is a threatened species internationally protected and listed in Annex I of the EU Birds Directive [1]. This long-distance migratory bird has a wide territorial distribution, with more than 50% of their European population distributed across Eastern Europe [2–4]. On the other hand, this species is very rare in Western Europe, where it has suffered from drastic reduction due to the destruction of its natural habitat [5]. Among the black stork reproduction areas in Europe, western Spain, bordering Portugal, is to be mentioned [5]. In mainland Portugal, this bird occurs inland, mainly associated with the hydrographic basins of Tagus, Douro and Guadiana rivers [6]. There are about 100 nesting couples in Portugal and some of these specimens are resident during the winter [6, 7]. Usually, black storks migrate to Africa in the autumn, returning to Europe during the spring [8, 9].

Information concerning parasitological fauna found in *C. nigra* is available in only a few published works, but data are still scarce and more studies are necessary in this area [9–14]. The main reason for this lack is related to the black stork's habitat, since these birds breed in dense wood areas where precise nesting surveys are difficult to carry out. Moreover, because they are included in the list of protected animals in Europe [9], human contact with them should be avoided in order to not disturb them in their natural habitat.

This report describes three different parasite species for the first time in a black stork from Portugal.

Methods

A female black stork was captured near Alqueva dam (38°11'51"N, 7°29'47"W), within the boundaries of the districts of Beja and Évora, southern Portugal, in March 2018, after colliding against electric cables. The specimen was received at the Wild Animal Rehabilitation Centre of Lisbon (LxCras) with several wounds, including an extensive hematoma in the pectoralis muscles, in the cranial zone of the keel and in the triceps muscle. After 3 days of treatment, the bird did not resist to injuries and the corpse was sent to the Pathology Service of the Faculty of Veterinary Medicine of the University of Lisbon for post-mortem examination. During the procedure, ectoparasites were collected to 70% ethanol and later placed on slides with lactophenol or Canada balsam [15] and observed under light microscopy. Collected endoparasites were placed in a Petri dish containing saline solution before microscopic examination.

Results

Three different parasites were found: lice on feathers (n = 26), nematodes in the gizzard (n = 2) and trematodes in the oesophagus (n = 27).

After preparation of lice by the Canada balsam technique, they were identified as *Neophilopterus tricolor* (Burmeister, 1838) (Figs. 1A and 1B), due to the presence of a fifth shorter marginal temporal seta when compared with the size of the other four setae.

Following endoparasite observation, nematodes were recognized as *Desportesius sagittatus* (Rudolphi, 1809) (Figs. 2A and 2B). This species has *C. nigra* as type host and all measures match with those observed for this species.

The trematodes were identified as *Cathaemasia hians* (Rudolphi, 1809) (Fig. 3A and 3B), due to the host and measures observed, which are in agreement with those reported for this species.

Discussion

In the present work, three different parasites of *C. nigra* were observed during necropsy of an adult specimen. Genus *Neophilopterus* (Ischnocera: Philopteridae) has already been described in black storks from Spain [10]. Ischnocera lice can affect host thermoregulation and induce feather breakage, reducing host fitness through the energetic consequences of that damage. Stress is also an indirect effect to the affected host [10]. Lice specimens found in this report's black stork had four marginal temporal setae of approximately the same length but the last one was several times shorter, thus being identified as *N. tricolor*. This is the first reference of this species in a black stork from Portugal.

In what refers to nematodes until the year 2015, only Austria, Czech Republic, Germany, Poland and Slovakia had information regarding helminth communities in storks [13]. Genus *Desportesius* (Nematoda: Acuarioidea) usually parasitizes birds of the order Ciconiiformes [16]. These nematodes occur under the gizzard lining [17], but nothing is known about their pathogenic effects on the hosts [14]. *Desportesius*

sagittatus has also been reported in *C. nigra* [13]. However, this is the first reference of this species in a black stork caught in mainland Portugal.

Considering trematodes, *C. hians* (Trematoda: Cathaemasiidae) is a well-known species which has members of family Ciconiidae as definitive hosts and are generally found in the oral cavity and sometimes in the oesophagus of these birds. However, reports of this species in Europe have been rare [12]. Black storks are more likely to be infected with this parasite than white storks (*Ciconia ciconia*), due to their different feeding behaviour [18]. In fact, white storks feed on arthropods and earthworms from permanent dry pastures [19, 20], and black storks ingest amphibians and fish parasitized with metacercariae of *C. hians*, which live in swamps and slow-flowing waters [12, 18]. *C. hians* is generally considered as non-pathogenic to storks [12, 13]. Nevertheless, this parasite can lead to irreversible alterations in the digestive tract of definitive hosts, lowering the birds' fitness. Massive infections by this parasite can cause serious health problems when combined with cachexia or lower immunity of the hosts [9, 13]. This is also the first reference for this parasite in a black stork captured in Portugal.

Scientific studies regarding these birds are difficult to accomplish since they are hard to access and protected by European laws. Thus, living animals can only be found after sustaining serious injuries [9, 12, 18], like in the present study.

Conclusion

Since parasitological works in *C. nigra* are scarce, this work is considered as an important contribution to this study field, reporting for the first time three parasite species in a black stork from mainland Portugal.

Declarations

Ethics approval and consent to participate

Not applicable

Consent for publication

Not applicable

Availability of data and material

All data generated or analyzed during the study are included in the article.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

DWR conceptualized the study, identified the parasites and wrote the manuscript. IC clinically co-assisted the black stork and reviewed the manuscript. EB clinically co-assisted the black stork and reviewed the manuscript. MM clinically co-assisted the black stork and reviewed the manuscript. LA participated in laboratory work and reviewed the manuscript. IPdF co-supervised the study and revised the manuscript. LC co-supervised the study and revised the manuscript. All authors read and approved the final manuscript.

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Figures

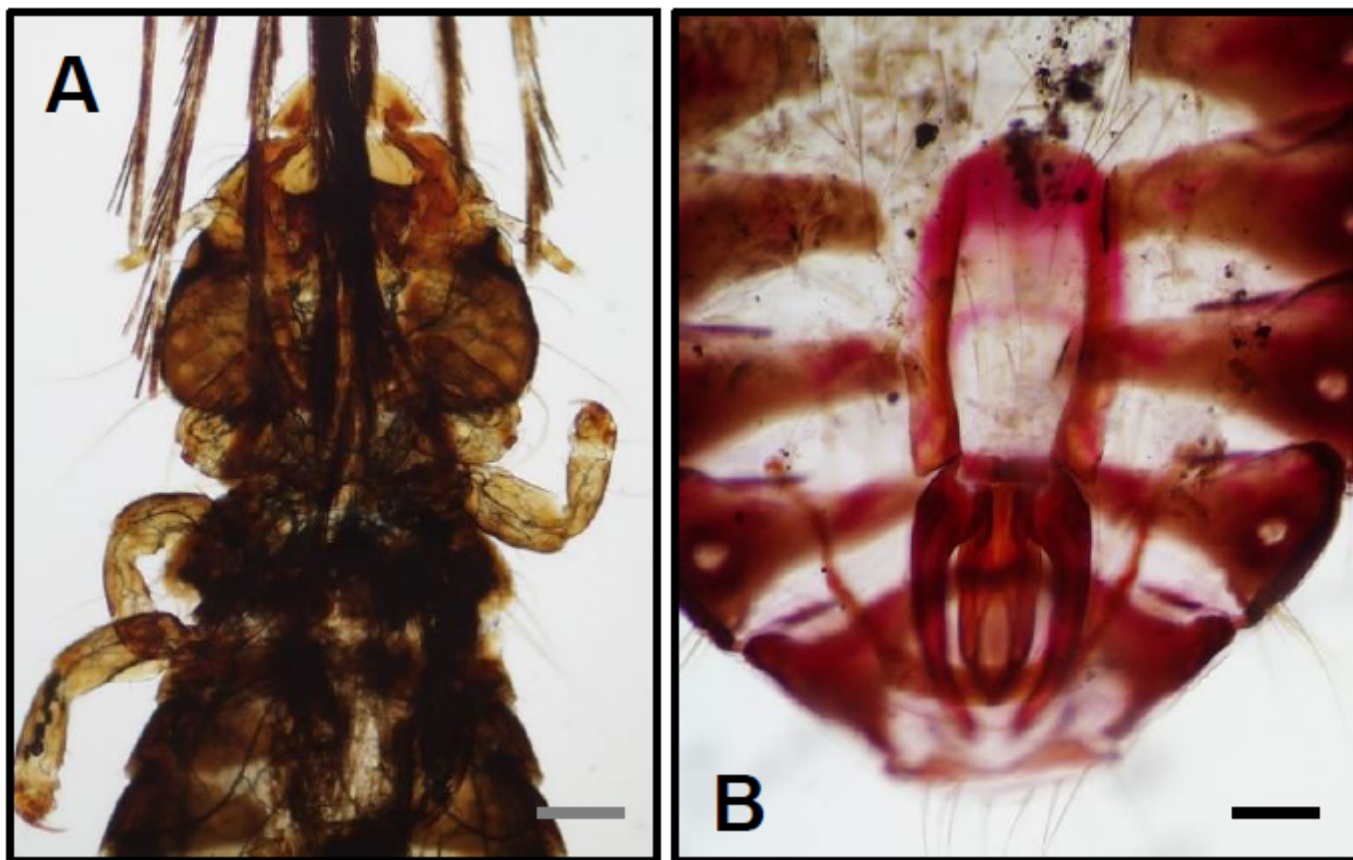


Figure 1

Neophilopterus tricolor. A: Head (scale bar: 231.4 μm); B: Abdomen of male specimen (scale bar: 210.8 μm).



Figure 2

Desportesius sagittatus female specimen. A: Posterior end (scale bar: 60 μm); B: Anterior end (scale bar: 67.4 μm).

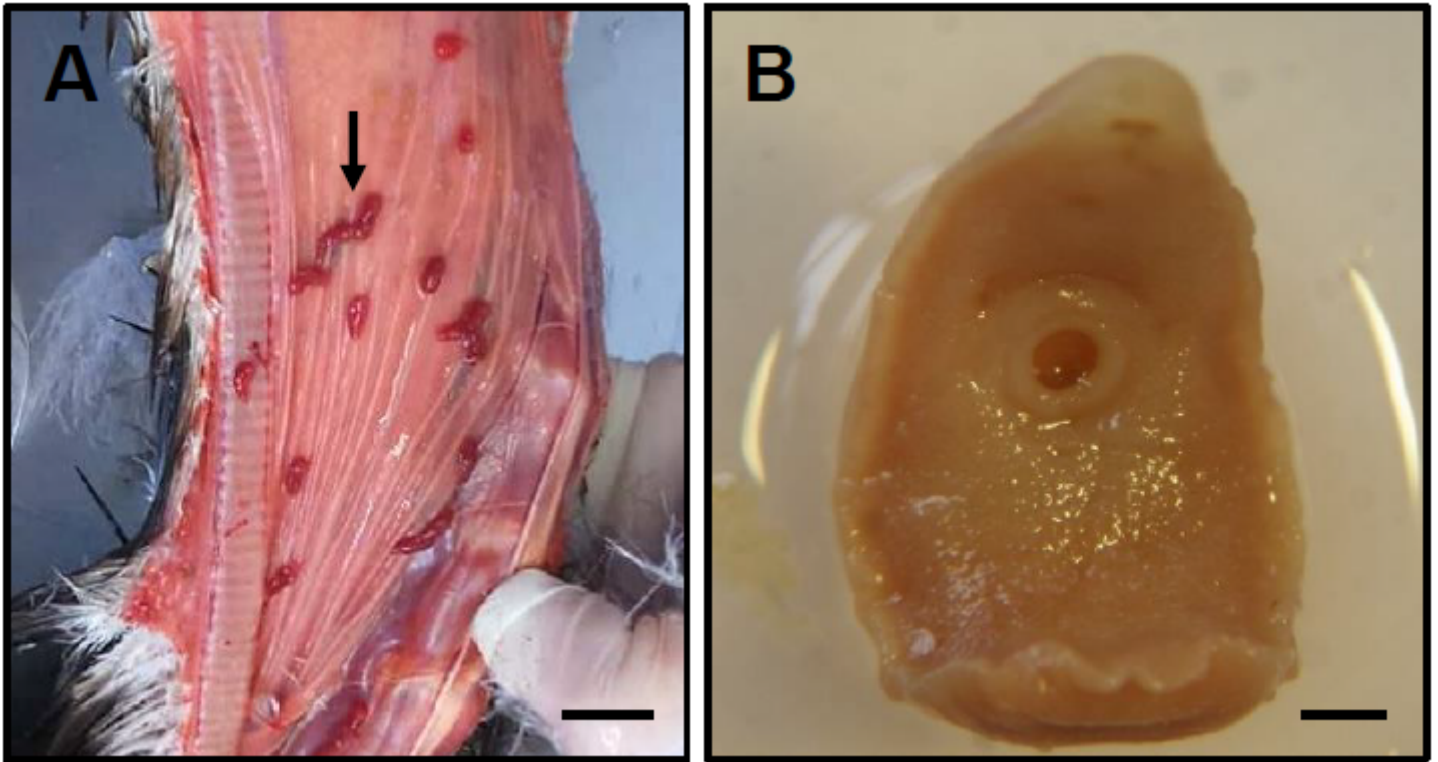


Figure 3

Cathaemasia hians. A: Specimens (black arrow) on oesophagus (scale bar: 14.4 mm); B: Ventral view (scale bar: 3.65 mm).

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