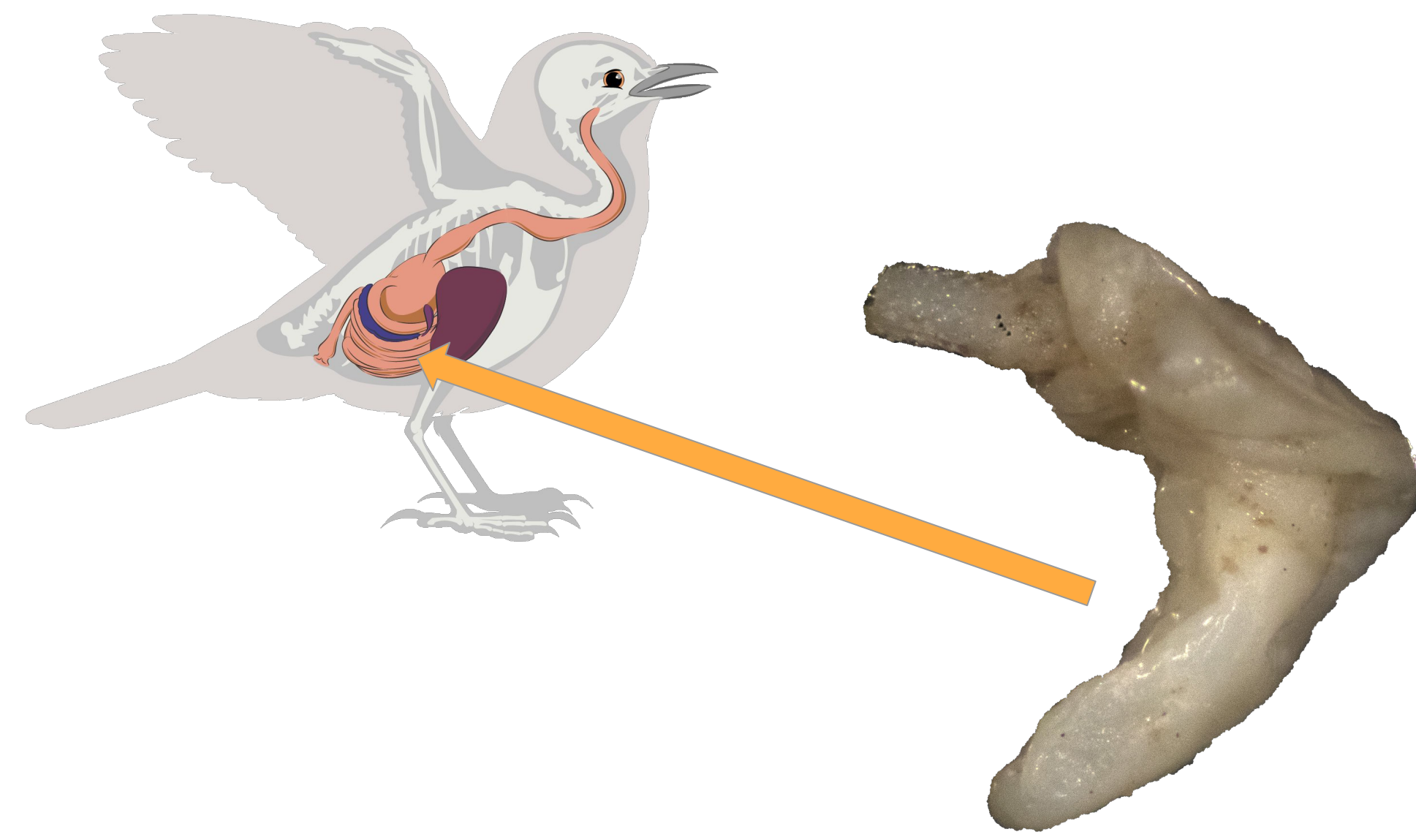


Parasites in a bird caught far off course



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Abstract

- Parasites were found in a corncrake (*Crex crex*) that was discovered on Long Island
- Corncrakes usually spend the summer in Eurasia and the winters in Africa, not in the USA
- We sequenced DNA from three genes to determine the identity of the parasite
- BLAST matches and phylogenetic analysis using DNA determined that the parasite is in the genus *Plagiorhynchus* (phylum Acanthocephala)
- We then did a CT scan of the *Plagiorhynchus* parasites to determine the genders of the parasite individuals in order to determine whether this group of organisms (presumably transported from Europe) were capable of giving rise to a new population locally in New York
- After studying the internal structure of the parasite, we concluded that the population contained both male and female and hence had the ability to give rise to a new population far from its origin in Eurasia

Introduction

- Crex crex*, or the corncrake, is a bird species that lives in Eurasia in the summer and Africa in the winter
- On extremely rare occasions, one of these birds will fly off course to the United States
- One of these rare vagrants was recently found on Long Island
- Two days after being spotted, this bird was hit by a car, providing a rare opportunity to see what parasites might be distributed by long distance dispersal
- This bird was carrying over 50 individuals of a parasite species that was visually identified to the phylum Acanthocephala
- This project investigates that parasite, and seeks to genetically identify what species it is and anatomically determine whether the parasites could possibly have reproduced locally and give rise to a new population

Materials and Methods

- Parasites were obtained from the digestive tract of an individual specimen of *Crex crex* from Long Island
- DNA was extracted from the parasites using a Qiagen DNeasy Blood and Tissue Kit
- Mitochondrial cytochrome c oxidase subunit I (COI) and ribosomal rRNA genes (18S and 28S) were sequenced to identify the parasite, following García-Varela and Nadler (2006)
- Sequences were analyzed using BLAST to determine an approximate species identity
- DNA sequences were also phylogenetically compared to closely related species using RAxML (Stamatakis 2014)
- We performed a micro computed tomography (CT) scan on four parasite individuals to determine their genders
- Prior to scanning, individuals were postfixed in alcohol formalin acetic acid and then osmium tetroxide, following Tessler et al. (2016)
- VGStudio Max 2.2 was used to visualize CT reconstructs of the internal structure of the parasite

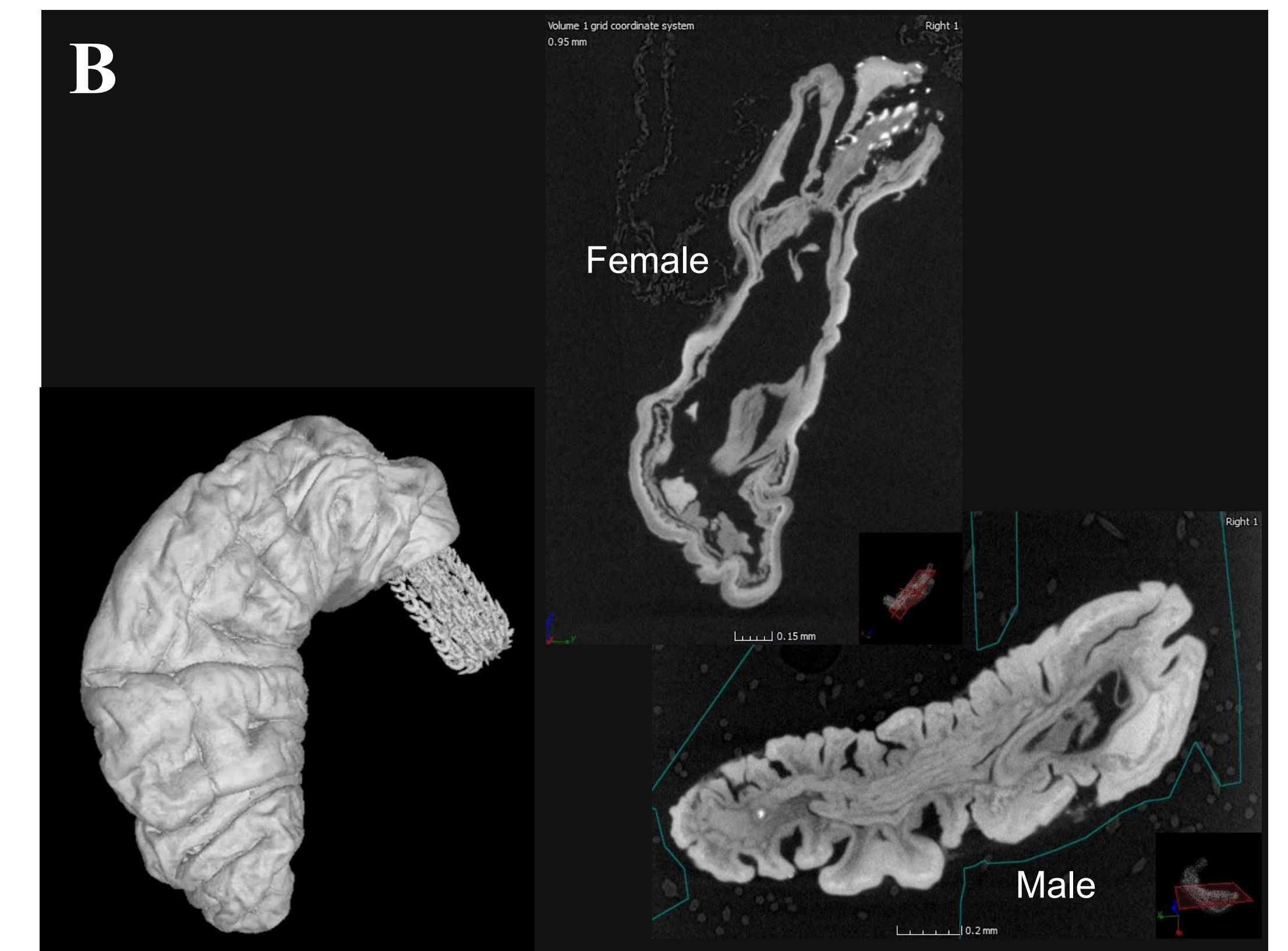
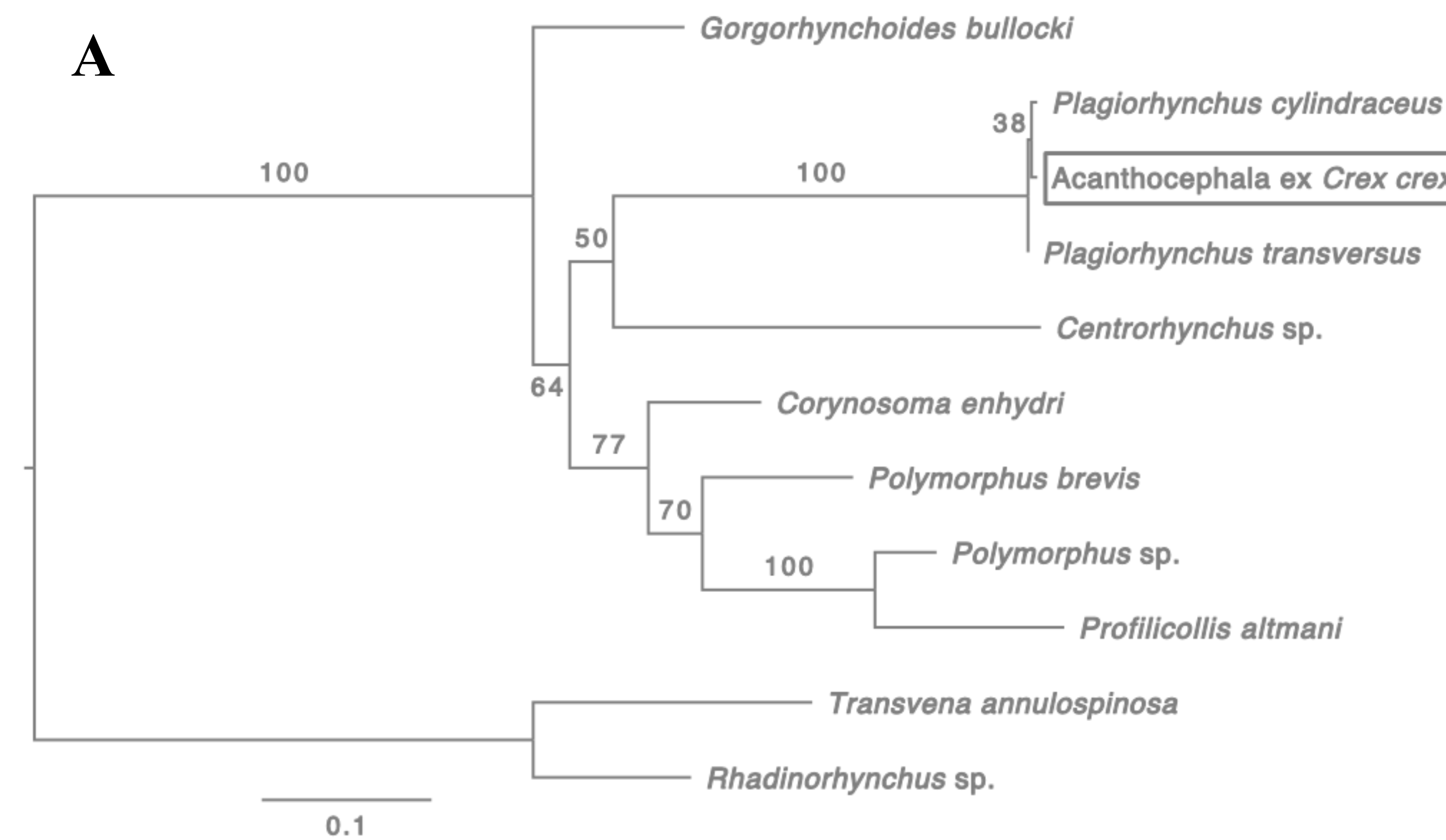
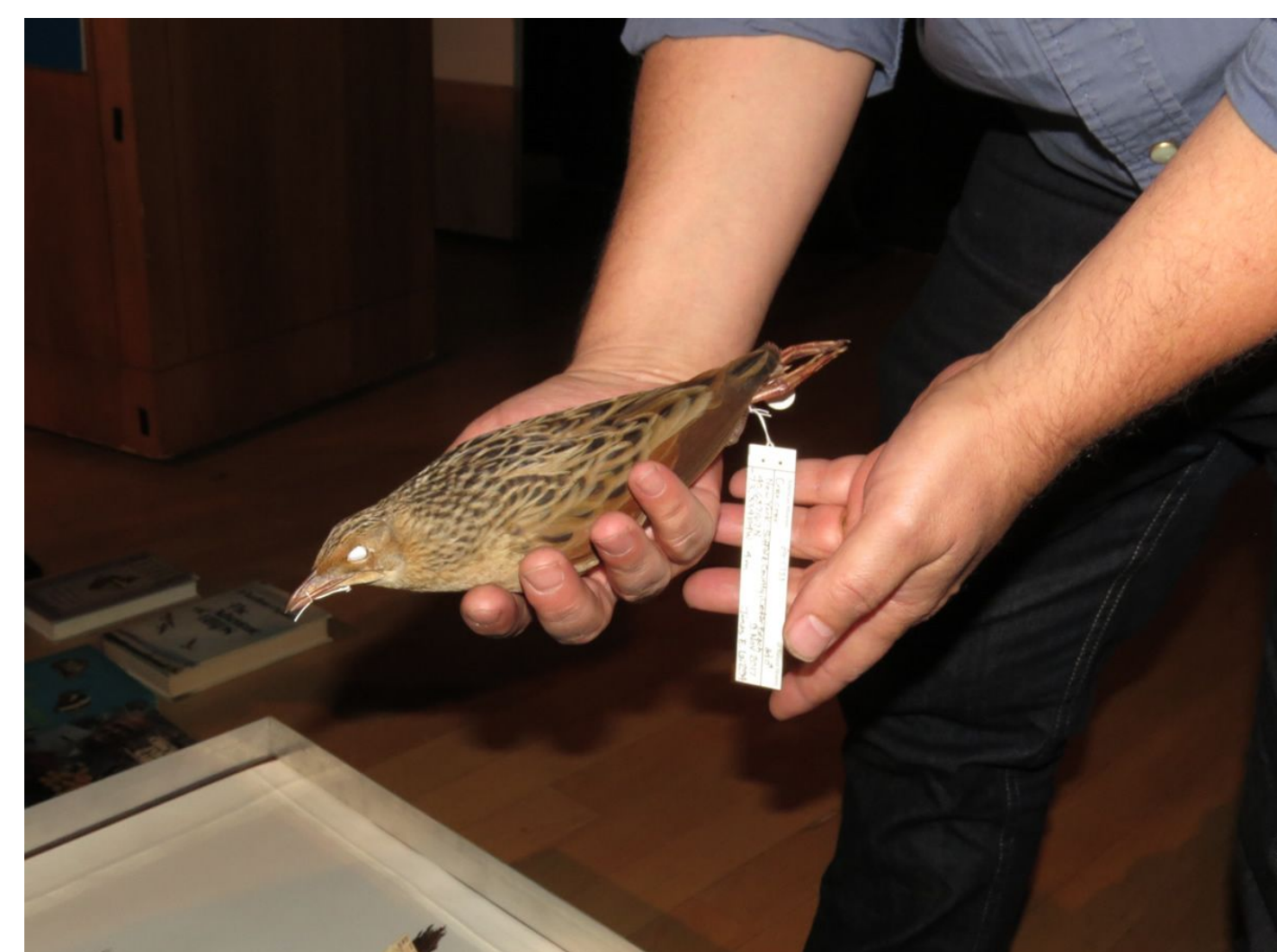


Figure 1. A. Maximum likelihood phylogeny of Acanthocephala species, with a focus on determining the closest relative to our parasites from the corncrake; B. 3D reconstruction of micro CT scan focusing on proboscis hooks on an acanthocephalan individual removed from the digestive tract of the corncrake), as well as 2D displays of the female and male reproductive structures.

Results

- BLAST and phylogenetic analysis (Figure 1A) confirmed that the parasite is in the phylum Acanthocephala
- These sequences were further determined that the parasite is in the genus *Plagiorhynchus*
- Half of the four individuals used for CT scanning were male and half were female worms
- A 3D visualization of one parasite is presented in Figure 1B, highlighting the external features

Discussion

- We phylogenetically determined the genus of the parasite as *Plagiorhynchus*
- As there were both males and females in the population of parasites, this parasite should have been able to produce a viable population in NY
- This is far from their original home range and could have implications for long distance dispersal of species
 - Could explain broad species distributions
 - Might explain species with wide distributions
- While many people have suggested that birds can disperse other organisms long distances, few studies (e.g., Lewis et al. 2014) have empirically shown this to be the case

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