

***Trichomonas gallinae* infection in European Turtle Doves *Streptopelia turtur* in Africa and potential for transmission among co-occurring African columbiformes**

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BACKGROUND

Trichomonas gallinae is an emerging avian pathogen in the UK and across Europe, leading to population declines in songbirds (especially greenfinches *Carduelis chloris*) where prevalence is high (Robinson *et al.*, 2010). The parasite is present worldwide, and elsewhere it is typically a pathogen of columbiformes, where it can have population limiting effects (Bunbury *et al.*, 2008). Recent work has shown a high prevalence in UK columbiformes, with the highest rates of infection (86%) in the migratory European Turtle Dove *Streptopelia turtur* (Lennon *et al.*, 2013). Infected individuals do not necessarily exhibit clinical signs, and carriers without clinical signs may transfer disease organisms between sites during migration (e.g. Rappole *et al.*, 2000) and exhibit reduced survival (Bunbury *et al.*, 2008). European Turtle Doves breeding in the UK are thought to have a non-breeding range spanning much of the Sahel in West Africa, coinciding with the range of several species of Afro-tropical columbids. *T. gallinae* may be transmitted between infected individuals at shared food and water sources, with this being of particular concern at those sites utilised by large numbers of birds. Such events may be frequent in the Sahel, where birds congregate at scarce water sources in an otherwise arid environment. This leads to concerns that intra- and inter-species transmission rates may be high during the non-breeding period.

STUDY SITES AND FIELD METHODS

The original site that had been selected for this study, in the north of Nigeria could not be used due to escalating security concerns in the region. Consequently, birds were sampled in Burkina Faso and Senegal (further details below). Doves – both migratory and resident species (further details below) – were caught using mist nets. Each bird was ringed using a metal ring (Ghana Ringing Scheme in Burkina Faso, BTO in Senegal) fitted to the tarsus, and standardised biometrics (wing length, tarsus length, weight; Redfern & Clark, 2001) recorded. In Senegal, for a subset of birds of each species, we also recorded whether the bird was actively moulting, along with the primary moult score (Redfern & Clark, 2001) to allow us to assess whether delayed moult may be associated with parasite infection.

Burkina Faso

The study site in Burkina Faso was located at Oursi, in the far north-east of the country (14.67°N, 0.46°W). Catching and sampling of turtle doves and other Afro-tropical *Streptopelia* species was carried out between October 2012 and Feb 2013 by AI and OI, using mist nets erected at regularly used roost sites.

Samples were collected from a total of 139 doves: 36 European Turtle Doves *Streptopelia turtur*, 88 Laughing Doves *Streptopelia senegalensis*, 3 African Collared Doves *Streptopelia roseogrisea*, 4 Vinaceous Doves *Streptopelia vinacea*, and 8 Mourning Doves *Streptopelia decipiens*. However, despite considerable effort, the necessary export permits were not forthcoming within the required time scale. These samples are currently still in cold storage in Ouagadougou, but are now likely to have deteriorated beyond the point at which there would be any value in pursuing their export.

Senegal

The study site in Senegal was located approximately 6km to the south of Sandiara, to the south-east of Dakar (14.38°N, 16.81°W), within an area of enclosed acacia scrub where estimates placed the number of wintering European turtle doves at around 1000 individuals. JCD and RCT visited the site for 12 days during late-February and early March 2014, with 6 species of dove observed to be using the site to roost (European Turtle Dove, Laughing Dove, Vinaceous Dove, Mourning Collared Dove, Namaqua Dove *Oena capensis* and Black-billed Wood Dove *Turtur abyssinicus*). Doves were caught using a combination of two-shelf wader mist nets and four-shelf Japanese mist nets (whoosh nets with which to specifically target Turtle Doves had been lost by the airline on route) positioned near a water source where doves had been observed drinking in small flocks.

Samples were collected from a total of 130 doves of 5 species: 11 European Turtle Doves, 30 Laughing Doves, 1 Vinaceous Dove, 73 Namaqua Doves and 19 Black-billed Wood Doves. Two Namaqua doves and two black-billed wood doves were re-trapped within the capture period, but were not re-sampled.

***Trichomonas* sampling methodology**

All birds that were ringed were sampled for the presence of *Trichomonas gallinae* parasites by taking an oral swab as described by Lennon *et al.* (2013). Once the oral cavity and upper gastrointestinal tract had been swabbed, each swab was immediately used to inoculate a uniquely identifiable, individual 'InPouch' Culture kit (BioMed diagnostics, Oregon, US). Culture kits were then incubated for a minimum of 72 hrs at 37°C before the parasites were isolated and stored in PBS prior to export to the UK.

MOULT

Analysis of variance of the subsample of individuals from which moult data were collected (n=55) indicated significant differences in moult score between species ($F_{4,51}=3.14$, $p=0.02$), with the European Turtle Dove being further ahead in its moult than the four resident species (Figure 1). Further analysis will assess whether parasite infection is linked to delayed moult within species.

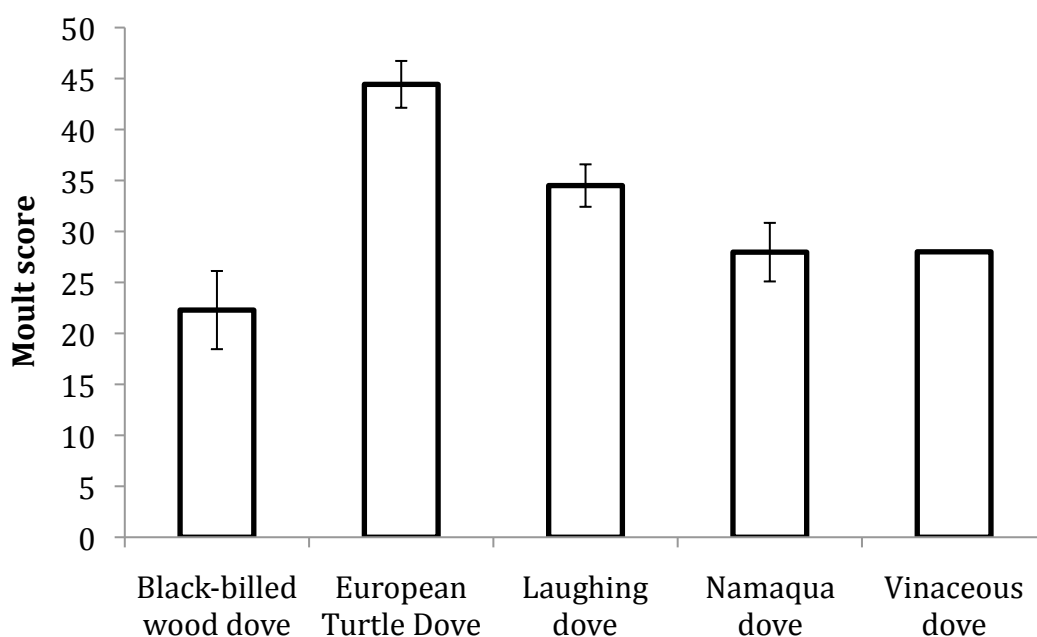


Figure 1. Mean \pm 1 SE moult score for the five dove species caught in Senegal

ANALYSIS OF TRICHOMONAS SAMPLES

Laboratory analyses of samples collected during this work are expected to be complete in autumn 2014, and results will be presented in a paper to be submitted for publication early in 2015.

ACKNOWLEDGEMENTS

This project was awarded a research grant of £2000 from the BOU in 2012, and was also supported by the African Bird Club and the RSPB. We are extremely grateful for the BOU's generous contribution, which met the cost of *Trichomonas* culture pouches and field equipment. Research in Burkina Faso was carried out with the permission of the Director of Wildlife and Hunting, and research in Senegal was carried out under a permit granted by Direction des Eaux, Forêts, Chasses et de la Conservation des Sols. Samples were imported to the UK under licences PATH/201/2012/1 and PATH/201/2012/2.

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