

LOW PREVALENCE OF INFECTION BY HAEMOPARASITES IN CETTI'S WARBLERS *CETTIA CETTI* FROM CENTRAL SPAIN

BAJA PREVALENCIA DE INFECCIÓN POR HEMOPARÁSITOS
EN RUISEÑORES BASTARDOS *CETTIA CETTI* DE ESPAÑA CENTRAL

S. MERINO*, J. SEOANE**, J. DE LA PUENTE*** & A. BERMEJO***

In spite of considerable effort devoted during the last two decades to understand the distribution and impact of blood parasites on their bird hosts, the species, prevalence and effects of blood parasites infecting many birds are still largely unknown (Peirce, 1981; Bennett *et al.*, 1982; Bishop & Bennett, 1992; Merino *et al.*, 2000). Knowing the presence and impact of blood parasites may be important for managing wild populations and for understanding parasite specificity and distribution, as well as interspecific interactions. In addition, pathogens may restrict the population range of their hosts and influence the competition between species (Freeland, 1983).

Cetti's Warblers live in marshy areas from Western Europe to Pakistan (Cramp, 1992). Their secretive behaviour and mimetic dull colour allows them to go unnoticed were it not because of their loud song. Males are larger than females, and polygynous males usually pair with one to three females, which lay one or two clutches per year (Bibby, 1982; Bibby & Thomas, 1984). The breeding period lasts from March to July and males appear to maintain territories year-round. Although plant food is an important dietary component in Spain, the species is mainly insectivorous (Molina *et al.*, 1998).

Cettia appear to be a bird genus with low prevalence of infection by haematozoa. Thirteen species in the genus have been described (Howard & Moore, 1991) and six of them have previously been sampled for haematozoa, with negative results with the exception of Cetti's

Warblers (see Peirce, 1981; Bennett *et al.*, 1982; Bishop & Bennett, 1992). Here we studied the prevalence, age distribution of infected individuals and time of infection by blood parasites in Cetti's Warblers *Cettia cetti*.

To capture birds, mist nets were operated once a week between December 1996 and December 1997. Ten nets of 12 meters and one of 18 meters long were used in an extensive reed-bed along the Jarama River near San Martín de la Vega (Madrid, Central Spain; 40° 19' N, 3° 32' W) during a long term monitoring project. All birds were captured within a period of six hours after sunrise, ringed with numbered aluminium rings and sexed and aged according to Svensson (1996) and Gargallo (1997). A drop of blood was obtained from the brachial vein and immediately smeared and air dried. Smears were fixed with absolute ethanol and stained with Giemsa (1/10 v/v with phosphate buffer at pH 7.2) for 45 min. Samples were scanned in search of blood parasites as described in Merino & Potti (1995) and Merino *et al.* (1997). In brief, half a smear was scanned at 200X in search of extraerythrocytic parasites and 20 fields were scanned at 400X. Oil immersion magnification was used for identification of parasites. The number of parasites per 2000 erythrocytes was used as an index of the intensity of infection (Godfrey *et al.*, 1987).

One hundred and twenty six individuals were captured, 32 of them were recaptured once, seven were recaptured twice and one was captured five times. Some individuals were in the area between September and March (win-

* Museo Nacional de Ciencias Naturales, CSIC, C/. José Gutiérrez Abascal, 2, E-28045 Madrid, Spain. E-mail: santiagom@mncn.csic.es. Author for correspondence.

** Departamento de Ecología, Universidad Autónoma de Madrid. E-28049 Madrid. Spain. *Present address*: Estación Biológica de Doñana, Avda. María Luisa s/n, Pabellón del Perú. E-41013 Sevilla. Spain. E-mail: seoane@ebd.csic.es

*** Departamento de Ecología, Universidad Autónoma de Madrid. E-28049 Madrid. Spain. E-mail: ana.bermejo@uam.es

ter) and others between March and September (breeding and post-breeding). The highest number of captures were in September when winter and post-breeding dispersing populations mix in the area.

Only four birds (3.2%) were infected, three of them by a *Plasmodium* species of the subgenus *Haemamoeba* and one by *Atoxoplasma* sp. Representative slides are deposited in the Museo Nacional de Ciencias Naturales, Madrid, Spain (access numbers: 35.02/1 and 35.02/2). The *Plasmodium* species may be one in the group comprising *P. relictum*, *P. subpraecox* and *P. giovannolai*, which cannot be separated based only on blood smears and host data (Greiner *et al.*, 1975). *P. subpraecox* is probably restricted to owls; the other two species have been previously recorded for Sylviinae, *P. relictum* being the most frequent (Bennett *et al.*, 1993a). The three individuals infected with *Plasmodium* were captured in July, August (males) and October (female), respectively. The individual infected in July had a very low intensity of infection with less than 0.1 parasites per 2000 erythrocytes. That bird was recaptured 15 days later and the infection was almost absent with only some trophozoites present in the smear. The male found infected in August showed a low intensity of infection with 0.2 parasites per 2000 erythrocytes and was previously sampled and found uninfected in June. The other infected bird was sampled only in October and showed a moderate intensity of infection with six parasites per 2000 erythrocytes. The three birds were aged as fledglings of the year. The individual infected by *Atoxoplasma* sp. was an adult female captured in September and it was not recaptured. The parasite infected small lymphocytes and the intensity of infection was low (less than 0.2 parasites per 2000 erythrocytes).

In accordance with previous reports, our results show that the Cetti's Warbler is a species with low prevalence of blood parasitism. The only previous record in Western Europe reports five uninfected individuals (Peirce, 1981) and the only other record for this species is one bird infected by *Haemoproteus* sp. (Mohammed & Al-taqi, 1975). This record comes from Kuwait where the species is present only during some months per year and a different subspecies is involved (*C. c. orientalis* instead of *C. c. cetti*). To our knowledge, these are the first re-

cords of infection by *Plasmodium* and *Atoxoplasma* in *Cettia cetti*.

The situation in Cetti's Warblers resemble that in Choughs *Pyrrhonorax pyrrhonorax* from a nearby area where *Plasmodium* appears in low numbers and apparently without severe effects on hosts (Blanco *et al.*, 1997). However, the presence of low intensity infections by *Plasmodium* in young, probably naive birds, may be also indicative of high pathogenicity causing death of birds suffering from high intensities of infection (Warner, 1968). The difficulty in capturing individuals with signs of illness, may obscure the effects of this parasite. In addition, the data presented here may indicate that this parasite is opportunistic, infecting low numbers of birds in the area, and probably more common than previously supposed (Blanco *et al.*, 1997). As this parasite is not highly host-specific, its population may be maintained in various species, some of which may be only rarely infected.

Atoxoplasma, previously *Lankesterella* (Levine, 1982), is a poorly known parasite genus, usually transmitted by vector swallowing and not by its bite as is the case for *Plasmodium* species. A considerable part of the diet of Cetti's Warblers consists on insects (Molina *et al.*, 1998), thus potentially leading to the ingestion of parasite vectors, an usual mode of transmission of *Atoxoplasma*. Parasites from this genus are considered pathogenic for birds, although data are scant (Manwell, 1977). For example, Cooper *et al.* (1989) reported large number of parasites in the liver and spleen of captive Greenfinches *Carduelis chloris* with the condition known as «going light», which is characterised by diarrhoea, weight loss, loss of appetite and ruffled feathers usually followed by high mortality. The only infected Cetti's Warbler was never recaptured but it was apparently in good condition and no sign of illness was detected.

Although the effects of blood parasites on wild birds are very difficult to note in short-term studies (but see Merino *et al.*, 2000), it is possible that haematozoan infections play an important role in birds' lives, as shown for domesticated species (Bennett *et al.*, 1993b). Cetti's Warblers are infected by two species of parasites considered pathogenic for birds, and although the low prevalence and lack of apparent, severe effects on the individuals infected

point to an absence of impact of these parasites on population regulation, some effects may be obscured by the difficulty in capturing individuals with signs of illness.

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