

SHORT COMMUNICATION

***Leucocytozoon toddi* and *Haemoproteus tinnunculi* (Protozoa: Haemosporina) in the Chimango Caracara (*Milvago chimango*) in Southern Chile**

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Two species of blood protozoans were identified from blood smears collected from 15 specimens of the Chimango caracara (Milvago chimango) on Isla Grande de Chiloé in southern Chile. These included Leucocytozoon toddi in 13 birds, including all 5 of the 4-6 week old nestlings examined, and 8 of the subadults or adults. One of the nestlings also had a dual infection of L. toddi and Haemoproteus tinnunculi. These are the first reports of blood parasites from M. chimango.

Key words: *Leucocytozoon toddi* - *Haemoproteus tinnunculi* - *Milvago chimango* - chimango caracara - Chile

The chimango caracara (*Milvago chimango*) is a member of the Falconidae family and is common in southern South America (del Hoyo et al. 1994). It is a generalist predator and feeds on a variety of foods including carrion, human refuse, and a number of animals such as invertebrates, nestling birds, and small mammals (Yañez et al. 1982). With the exception of certain facets of its food habits and breeding biology, little is known about this Neotropical raptor (Fraga & Salvador 1986, Morrison & Phillips 2000). Published data on its parasites are limited to one paper on chewing lice (Tendeiro & Mendes 1994) and one on parasitic helminths (Boero & Led 1971). No information on blood parasites has been published. Herein we report information on blood parasites obtained while one of us (JLM) was studying the nesting habitat and success of *M. chimango* during two breeding seasons of this caracara in southern Chile.

Fifteen *M. chimango*, 5 nestlings (4-6 weeks of age) and 10 non-breeding subadults or breeding adults, were sampled. These birds were captured on private farms on the northeastern end of Isla Grande de Chiloé, located in Region X in southern Chile (43°55'S, 73°35'W), during the months of November, December, and January of 1998-1999 ($n = 13$), and January of 2000 ($n = 2$). The sampling was done essentially at sea level. Additional details on the study area and capture methods are given by Morrison and Phillips (2000).

Thin blood films were made from peripheral blood, air dried, and subsequently fixed in absolute methanol and stained with Giemsa for 1 h at pH 7.0. Films were examined at 400X and 1,000X oil immersion to detect the presence of blood parasites. At least 10,000 red cells were examined on each slide.

Two species of blood protozoans were identified. *Leucocytozoon toddi* was found in 13 (87%) birds, including all the nestlings and 8 of the subadults or adults. One nestling had a dual infection of *L. toddi* and *Haemoproteus tinnunculi*.

Greiner and Kocan (1977) studied the various species of *Leucocytozoon* reported from falconiforms and determined that they are all synonyms of *L. toddi*. They further concluded that this species was highly variable morphologically and was the only leucocytozoid infecting falconiforms worldwide. In a subsequent publication, White et al. (1978) concluded that species of *Leucocytozoon* are transmitted to birds in the Neotropics, but at a very low rate and prevalence. Overall, they found that only 0.2% of 35,555 birds

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(955 species representing 80 families) were infected with a species of *Leucocytozoon*. This was in contrast to the findings of a similar study in North America where 17.7% of 57,026 birds (388 species of 55 families) had *Leucocytozoon* infections (Greiner et al. 1975). The reasons for the paucity of *Leucocytozoon* infections in South American birds are not clear, but White et al. (1978) suggested that it might be due to low sample sizes or to the absence or low prevalence of appropriate vectors. They further stated that all of the *Leucocytozoon* infections included in their analysis were from the montane regions where the necessary lotic habitats needed for the reproduction and development of simuliid vectors are more common. We are aware of only one previous record of a *Leucocytozoon* infection in a Neotropical raptor; that was in an American kestrel (*Falco sparverius*) in Mexico (Beltrán & Pardiñas 1953). We know of no records of *Leucocytozoon* species in any of the nine species of caracaras that occur in South America. No leucocytozoid infections were identified in 223 crested caracaras (*Caracara plancus*) examined in southern Florida (Foster et al. 1998). The fact that all of the nestlings that we sampled on Isla Grande de Chiloé were infected by *L. toddi* is an indication that the simuliid vectors are breeding near the nesting sites of *M. chimango* and transmitting infections to them on the nest. Adult birds may also become infected on or near the nest. Although we did not sample for simuliid vectors, habitats on Chiloé provide suitable conditions for them. Perennial streams and rivers are common, as are swamps and ponds. The climate is temperate and humid; annual rainfall averages 2000 mm.

Peirce et al. (1990) reviewed the haemoproteids of the Falconidae and concluded that there were two valid species, *H. brachiatus* and *H. tinnunculi*. *H. brachiatus* has been reported only from the European kestrel (*F. tinnunculus*) in Lithuania and its validity requires verification. *H. tinnunculi* is more widespread and has been found in several species of kestrels in North America, Europe, Africa, and Asia (Peirce et al. 1990). It has been reported from crested caracaras in Florida (Foster et al. 1998) and American kestrels (*F. sparverius*) in Florida (Forrester et al. 1994) and other parts of United States and Canada (Bishop & Bennett 1992). In addition, *H. tinnunculi* may infect other South American falconids, including caracaras and kestrels, although this is yet to be determined. Both crested caracaras and American kestrels are found on Isla Grande de Chiloé, are known to breed there (JL Morrison, unpublished observations), and may be additional hosts of *H. tinnunculi* in the ecosystem. The fact that only one of the 15 *M. chimango* examined was infected with *H. tinnunculi* may be

an indication that the ceratopogonid vectors are present on the island, but in low numbers.

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