

HELMINTH PARASITES OF PISCIVOROUS BIRDS FROM LAKES IN THE SOUTH OF CHILE

P. TORRES; R. SCHLATTER*; A. MONTEFUSCO; W. GESCHE; E. RUIZ & A. CONTRERAS

Instituto de Parasitología, *Instituto de Zoología (Ornitología) Universidad Austral de Chile, Casilla 567, Valdivia, Chile

Studies of the endoparasites of piscivorous birds in Chilean fresh-water ecosystems have been going on for the last fifteen years. Previously published papers referred to some particular species of the rio Valdivia watershed (39°30' – 40°00' South Lat.), including *Diphyllobothrium dendriticum* (Nitzsch, 1824), *Stephanoprora denticulata* (Rudolphi, 1802) and *Contracaecum rudolphii* (Hartwich, 1964) or to groups of helminths in general, also within the same watershed and in some lakes south of latitude 42° (P. Torres et al., 1981, *J. Helminthol.*, 55: 173-187; 1991, *J. Wild. Dis.*, 27: 178-179; 1992, *Arch. Med. Vet.*, 24: 77-92).

The present study reports the finding of gastrointestinal helminths in piscivorous birds in lakes in southern Chile for the first time. The prevalence and intensity of these infections are also given.

Between 1989 and 1990, 48 piscivorous birds were killed by shotgun and the gastrointestinal tract was examined for helminth parasites. Procedure of necropsy, collection, fixation, staining and mounting of helminths was to that described previously (P. Torres et al., 1991, *loc. cit.*).

The species, areas of capture, and the helminths found plus their prevalence and mean intensity are indicated in Table. For the bird species *Larus dominicanus* (Lichtenstein, 1823) and *Larus maculipennis* (Lichtenstein, 1823), young and adult specimens are included. Samples for the other species included only adult birds. Stomach contents of 15 *L. dominicanus*, 19 *L. maculipennis*, 7 *Phalacro-*

corax olivaceus (Humboldt, 1805), 1 *Ceryle torquata* (Linnaeus, 1758) and 1 *Nycticorax nycticorax* (Linnaeus, 1758), were all fixed in 5% formalin and frequency of fish consumption was determined.

All helminth taxa with the exception of *D. dendriticum*, represent first geographic records and the trematodes *Diplostomum minutum* Szidat, 1964 and *Cryptocotyle* sp. are recognized for the first time in Chile. *Contracaecum rudolphii* and *Capillaria* sp. were found in the muscular and glandular stomach respectively. The other helminth species were collected from intestines. *Contracaecum rudolphii* infections were represented by adults and larval stages. Almost all specimens of *Polymorphus (Profilocollis)* sp., *Contracaecum* sp. and *Tetrabothrius* were juveniles. The rest of the helminths were adult specimens.

Eight different taxa of parasites were identified in *L. dominicanus*, 6 for *L. maculipennis* and 2 for *P. olivaceus* (Table). For *Podiceps major* (Boddaert, 1785), *N. nycticorax* and *C. torquata* only one taxon was found for each species (*Aploparaksis* sp., *Polymorphus (Profilocollis)* sp. and *Cryptocotyle* sp., respectively). Five of the six taxa present in *L. maculipennis* were registered in *L. dominicanus* (Table).

The analysis of stomach contents verified the presence of fish remains in all of the *C. torquata* and *N. nycticorax* and in 53.3%, 47.4% and 85.7% of the specimens of *L. dominicanus*, *L. maculipennis* and *P. olivaceus*, respectively.

Six of the eight taxa of endoparasites found in *L. dominicanus*, 2 of the 6 encountered in *L. maculipennis*, the 2 taxa collected in *P. olivaceus*, as well as the only one determined in *C. torquata* are transmitted through fish consumption, prey which act as intermediate

This work received financial support from FONDECYT (Grant 69/89) and Dirección de Investigación of Universidad Austral de Chile (Grant S-92-01).

Received 20 October 1992.

Accepted 2 March 1993.

TABLE
Prevalence and mean intensity of helminths in piscivorous birds from lakes in the south of Chile

Lakes/hosts/helminths	Prevalence ^a	Mean intensity ^b (range)
Llanquihue (41°04'S, 72°48'W)		
<i>Larus dominicanus</i>		
<i>Stephanoprora denticulata</i> (T)	4/6	11 (2-30)
<i>Cryptocotyle</i> sp. (T)	2/6	39 (4-74)
<i>Tetrabothrius cylindraceus</i> (C)	1/6	12 (12)
<i>Anomotaenia dominicanus</i> (C)	1/6	3 (3)
<i>Contracaecum</i> sp. (N)	3/6	1,3 (1-2)
<i>Capillaria</i> sp. (N)	3/6	2,0 (1-4)
<i>Larus maculipennis</i>		
<i>Diphyllobothrium dendriticum</i> (C)	1/4	1 (1)
<i>Capillaria</i> sp. (N)	1/4	1 (1)
<i>Phalacrocorax olivaceus</i>		
<i>Contracaecum rudolphii</i> (N)	2/2	64 (3-125)
<i>Corynosoma arctocephali</i> (A)	1/2	9 (9)
Todos los Santos (41°05'S, 72°15'W)		
<i>Larus dominicanus</i>		
<i>Stephanoprora denticulata</i> (T)	1/1	2 (2)
<i>Contracaecum</i> sp. (N)	1/1	1 (1)
<i>Phalacrocorax olivaceus</i>		
<i>Contracaecum rudolphii</i> (N)	2/2	6.5 (5-8)
Rupanco (40°46'S, 72°30'W)		
<i>Larus dominicanus</i>		
<i>Stephanoprora denticulata</i> (T)	2/4	18 (3-33)
<i>Cryptocotyle</i> sp. (T)	1/4	14 (14)
<i>Diphyllobothrium dendriticum</i> (C)	2/4	1 (1)
<i>Tetrabothrius cylindraceus</i> (C)	3/4	3 (2-5)
<i>Anomotaenia dominicanus</i> (C)	2/4	5 (3-17)
<i>Phalacrocorax olivaceus</i>		
<i>Contracaecum rudolphii</i> (N)	1/1	6 (6)
<i>Ceryle torquata</i>		
<i>Cryptocotyle</i> sp. (T)	1/1	2 (2)
Puyehue (40°36'S, 72°16'W)		
<i>Larus maculipennis</i>		
<i>Diphyllobothrium dendriticum</i> (C)	1/5	1 (1)
<i>Anomotaenia</i> sp. (C)	1/5	1 (1)
<i>Capillaria</i> sp. (N)	2/5	1 (1)
<i>Polymorphus (Profilicollis)</i> sp. (A)	1/5	1 (1)
Maihue (40°15'S, 72°02'W)		
<i>Larus maculipennis</i>		
<i>Polymorphus (Profilicollis)</i> sp. (A)	2/2	5.5 (5-6)
<i>Phalacrocorax olivaceus</i>		
<i>Contracaecum rudolphii</i> (N)	2/2	22.5 (12-33)
Ranco (40°11'S, 72°22'W)		
<i>Larus maculipennis</i>		
<i>Polymorphus (Profilicollis)</i> sp. (A)	2/2	6.5 (6-7)
<i>Podiceps major</i>		
<i>Aploparaksis</i> sp. (C)	1/2	153 (153)
<i>Nycticorax nycticorax</i>		
<i>Polymorphus (Profilicollis)</i> sp. (A)	1/1	5 (5)
Villarrica (39°13'S, 72°06'W)		
<i>Larus dominicanus</i>		
<i>Cryptocotyle</i> sp. (T)	1/1	3 (3)
<i>Diplostomum minutum</i> (T)	1/1	3 (3)
<i>Larus maculipennis</i>		
<i>Tetrabothrius</i> sp. (C)	1/8	5 (5)
<i>Anomotaenia dominicanus</i> (C)	2/8	3 (3)
<i>Ceryle torquata</i>		
c		
Caburga (39°06'S, 71°45'W)		
<i>Larus dominicanus</i>		
<i>Cryptocotyle</i> sp. (T)	2/3	201.5 (200-203)
<i>Diplostomum minutum</i> (T)	3/3	8.3 (3-13)
<i>Diphyllobothrium dendriticum</i> (C)	1/3	1 (1)
<i>Tetrabothrius cylindraceus</i> (C)	1/3	8 (8)
<i>Anomotaenia dominicanus</i> (C)	1/3	3 (3)
<i>Capillaria</i> sp. (N)	2/3	7.5 (2-13)

a: no. birds infected/no. examined; b: mean number of parasites per infected fishes; c: one specimen without infection.
T: Trematoda. C: Cestoidea. N: Nematoda. A: Acanthocephala.

and/or paratenic hosts for *S. denticulata*, *D. dendriticum*, *Contracaecum* spp., *D. minutum*, *Cryptocotyle* sp., *Tetrabothrius* spp. and *Corynosoma arctocephali* Zdzitowiecki, 1984 (L. Szidat, 1964, *Z. Parasitenk.*, 24: 351-414; G. Hoffmann, 1967, *Parasites of North American freshwater fishes*, University of California Press, 486 p.; P. Nasir & L. Rodriguez, 1969, *Zool. Anz.*, 182: 230-244; K. Zdzitowiecki, 1984, *Acta Parasitol. Pol.*, 29: 359-377; E. P. Hoberg, 1986, *Ann. Parasitol. Hum. Comp.* 61: 199-214).

Some of the species identified, like *C. arctocephali* and *Tetrabothrius* spp., have marine life cycles and their presence in the birds captured in lakes suggest that these birds do travel between the interior lakes and the coast where they consume intermediate and/or paratenic hosts.

The maintenance of parasite life cycles between populations of birds and fishes can be of interest in salmon culture, an activity which

has increased since 1981 and which is of considerable economic importance to Chile. There is a potential risk if infected bird populations increase in these areas. This problem has been observed in research related to *Contracaecum* sp. in Canada (T. Dick et al., 1987, *J. Wild. Dis.* 23: 242-247). Something similar could happen with the infection of *D. dendriticum* which can be of potential risk for introduced fishes managed in aquaculture, as has been demonstrated for salmonids in Scotland (R. Wootten & J. W. Smith, 1979; *Scottish Fish. Res.*, 13: 1-8). Infections by *Contracaecum* spp. and *D. dendriticum* have been shown for wild salmonids in freshwater ecosystems of southern Chile (P. Torres, 1990, *Arch. Med. Vet.* 22: 105-107, Torres et al., 1981, *loc. cit.*; 1991, *Mem. Inst. Oswaldo Cruz, Rio de Janeiro*, 86: 115-122).

The material collected was deposited in the collection of the Institute of Parasitology, Universidad Austral de Chile, Valdivia, Chile (IPUAT no. 0215-0229).