RESEARCH NOTE

Wild Birds as Reservoir of Thermophilic Enteropathogenic *Campylobacter* Species in Southern Chile

H Fernández+, W Gesche✶/*, A Montefusco*, R Schlatter**

Instituto de Microbiología Clínica *Instituto de Salud Pública **Instituto de Zoología, Universidad Austral de Chile, Casilla Postal 567, Valdivia, Chile

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Thermophilic *Campylobacter* species (*C. jejuni* subsp. *jejuni*, *C. coli* and *C. lari*) are zoonotic bacteria worldwide recognized as important enteropathogens for human beings (P Vandamme & H Goosens 1992 *Zbl Bakt 276*: 447-452, H Fernández 1992 *Ciên Cult 44*: 39-43). A wide range of domestic and wild animal species, including mammals and birds, have been identified as natural reservoirs of *Campylobacter* in industrialized as well as in developing countries and, they could be a source of contamination for human beings, other animals, food and environmental water bodies (G Kapperud & O Rosef 1983 *Appl Environ Microbiol 45*: 375-380, O Rosef et al. 1983 *Appl Environ Microbiol 46*: 855-859, M Blaser et al. 1983 *Epidemiol Rev 5*: 157-176, Fernández *loc. cit.*).

In the present study, wild birds from southern Chile were surveyed for fecal carriage of the classical thermophilic *Campylobacter* species in order to assess the regional wildlife reservoir of these bacteria.

Cloacal swabs were collected from a total of 392 adult wild-living birds representing seven species (Table). The birds were sampled in several places of the province of Valdivia (39º28'-40º20' southern latitude, 71º30'-73º45' western longitude) and the cloacal material collected was seeded into the transport-enrichment medium described by H Fernández (1992 *Rev Microbiol São Paulo 23*: 149-151) and transported to the laboratory. Following an enrichment period of 24 hr at 42ºC under microaerobic conditions in a GasPak system without the catalyst, cultivation was performed by plating each sample onto Skirrow agar. Plates were incubated for 48 hr under the same conditions described above. Suspected colonies were identified morphologically (Gram stain), biochemically (oxidase, catalase, sensitivity to nalidixic acid and cephalotin, hippurate hydrolisis) and biotyped by Lior's scheme (1984 *J Clin Microbiol 20*: 636-640).

The results obtained are shown in the Table. From the 392 birds studied, 95 (24.2%) harbored thermophilic *Campylobacter* species being *C. jejuni* subsp. *jejuni* the most frequently isolated (69.5% - 66/95) followed by *C. coli* (23.1% - 22/95). *C. lari* was isolated only from waterfowl (7.4% - 7/95).

The frequency which *Campylobacter* was recovered from wild ducks (67.4%) is higher than that reported by N Luechtefeld et al. (35%) in northern Colorado (1980 *J Cin Microbiol 12*: 406-408) and similar to that reported by R Pacha et al. (73%) in central Washington (1988 *Can J Microbiol 34*: 80-82). In those birds, as well as in seagulls and cormorants, we found the three classical thermophilic species of *Campylobacter*. From the two swans that were included in this study, one harbored *C. jejuni* subsp. *jejuni* and the second, *C. lari*. These results support previous findings (Luechtefeld et al. *loc.cit.*, Pacha et al. *loc. cit.*) and suggest that waterfowl are natural reservoirs that could play a role in the waterborne spread of these bacteria. Waterborne outbreaks of *Campylobacter*-associated gastroenteritis involving aquatic birds as possible contamination source have been reported (SR Palmer et al. 1983 *Lancet 1*: 287-290, A Borczyc et al. 1987 *Lancet 1*: 164-165).

The isolation rate of *Campylobacter* from pigeons and sparrows was higher than the one reported by S Matsusaki et al. in Japan (1985 *3rd International Workshop on Campylobacter infection*, Ottawa, Canada, Abstract Nº 160) but slightly lower than the one reported in 1988 by H Fernández (1988 *Rev Inst Med Trop São Paulo 30*: 357-360) for the same birds species from our geographical region. Pigeons and sparrows are birds that can live near human habitat and could be sources of contamination for water supplies and environment (Palmer *loc.cit.*).

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✶*In memoriam*, deceased 27 May 1995

+Corresponding author. Fax: +56-63-214475

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The lowest isolation rate was obtained from chimango caracara hawks (3.5%), and as far as we know, this would be the first identification of members of the family *Falconidae* as reservoirs of thermophilic *Campylobacter* species.

Considering these results and previously published data (H Fernández et al. 1994 *Rev Inst Med Trop São Paulo 36*: 433-436), we can conclude that there exists an extensive indigenous reservoir of thermophilic *Campylobacter* in southern Chile. However, we do not know the contribution of each of these identified reservoirs to human infection. O Rosef et al. (1985 *Appl Environ Microbiol 49*: 1507-1510) and Y Weisman et al. (1986 *Israel J Med Sci 22*: 149) reported that wild birds carry *Campylobacter* serotypes that also occur in cases of human *Campylobacter* enteritis. Nevertheless, the potencial role of these birds in the epidemiology of human campylobacteriosis will require further studies involving antigenic, pathogenic and genotypic characterization of avian and human isolates.

TABLE

Isolation rates of thermophilic *Campylobacter* species and their biovars (Lior scheme) from different species of wild birds

Wild birds	N	Positive	*C. jejuni* subsp. *jejuni*			*C. coli*		*C. lari*	
			biov I	biov II	biov III	biov I	biov II	biov I	biov II
Yellow-billed Pintail *Anas georgica*	46	31(76.4)	6(19.3)	8(25.8)	2(6.4)	7(22.6)	5(16.1)	2(6.4)	1(3.2)
Kelp Gull *Larus dominicanus*	15	8(53.3)	2(25.0)	1(12.5)	0(0)	0 (0)	3(37.5)	1(12.5)	1(12.5)
Olivaceus Cormorant *Phalacrocorax olivaceus*	11	6(54.6)	1(16.7)	2(33.3)	1(16.7)	1(16.7)	0(0)	0(0)	1(16.7)
Black-necked Swan *Cygnus melanocorypha*	2	2(100)	0(0)	1(50.0)	0(0)	0(0)	0(0)	0(0)	1(50.0)
Feral Pigeon (intr.) *Columba livia*	104	11(10.6)	3(27.3)	4(36.4)	0(0)	1(9.1)	3(27.3)	0(0)	0(0)
Chimango Caracara *Milvago chimango*	114	4(3.5)	1(25.0)	2(50.0)	0(0)	1(25.0)	0(0)	0(0)	0(0)
European Sparrow (intr.) *Passer domesticus*	100	33(33.0)	11(33.3)	17(51.5)	4(12.1)	0(0)	1(3.0)	0(0)	0(0)
Total	392	95(24.2)	24(25.3)	35(36.8)	7(7.4)	10(10.5)	12(12.6)	3(3.2)	4(4.2)

N= number of birds studied; biov= biovar; ( ) = %.