



RESEARCH COMMUNICATION

Seroprevalence of *Toxoplasma gondii* and *Chlamydia psittaci* in domestic pigeons (*Columba livia domestica*) at Sebele, Gaborone, Botswana

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ABSTRACT

MUSHI, E.Z., BINTA, M.G., CHABO, R., NDEBELE, G.R. & PANZIRAH, R. 2001. Seroprevalence of *Toxoplasma gondii* and *Chlamydomphila psittaci* in domestic pigeons (*Columba livia domestica*) at Sebele, Gaborone, Botswana. *Onderstepoort Journal of Veterinary Research*, 68:159–161

High antibody titres to *Toxoplasma gondii* and *Chlamydomphila psittaci* were demonstrated in serum collected from domestic pigeons at average titres of 1:128 and 1:64 respectively. The public health implications of these findings are discussed.

Keywords: Antibodies, Botswana, domestic pigeons, *Chlamydomphila psittaci*, *Toxoplasma gondii*

INTRODUCTION

In Botswana, pigeons (*Columba livia domestica*) are kept for meat by some households, not only in suburban but also rural households (Mushi, Binta, Chabo, Mathaio & Ndebele 1999). Although they are often kept in cages and fed on scraps of left-over foods or given food *ad libitum*, they often fly out in search of more food and can therefore considered to be feral pigeons.

Toxoplasma gondii belongs to the family Sarcocystidae of the subclass Coccidiacina. The definitive hosts of this parasite are the domestic cat and other Felidae (Stewart & Turner 1994). Cats are infected when they ingest cysts contained in tissues of intermediate hosts, such as mice and birds, as well as by the ingestion of sporulated oocysts in faecally contaminated soil (Frenkel 1978). Seroprevalence of toxoplasmosis, a cosmopolitan protozoan infection in the human population, varies between 20–40% (Dubey

1987). *Chlamydomphila psittaci*, the cause of ornithosis, a respiratory tract infection in psittacine and non-psittacine birds, also infects humans (Pienaar & Schutte 1994).

Although reports of abortions due to chlamydiosis and toxoplasmosis among sheep and goats in this country during winter have been published (Binta, Mushi & Adom 1996; Binta, Mushi, Raborokgwe, Monyane & Ndebele 1996; Binta, Monyame, Ndebele, Mushi & Raborekgwe 1998), the diagnosis was based only on seroprevalence and not on isolation or demonstration of the pathogens.

There is a paucity of information regarding the antibody status of pigeons pertaining to *T. gondii* and *C. psittaci* in domestic pigeons in Botswana. In the present study, the seroprevalence of these organisms in pigeons kept in Sebele, Gaborone, was determined.

MATERIALS AND METHODS

Sixteen pigeons kept at Sebele stated to be 12 km north of Gaborone, were used in the present study. Blood was collected from the brachial vein into vacutainer tubes without anticoagulant. The blood was allowed to clot, and the serum was separated by centrifugation and stored at –20 °C.

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Antibodies to *C. psittaci* were determined using the complement fixation test as prescribed by the manufacturers of the kits (Behringwerke AG, Germany) while antibodies to *T. gondii* were determined by an indirect haemagglutination test using commercial kits (Cellognost Toxoplasmosis Behringwerke AG, Germany).

RESULTS

All 16 pigeons tested had antibodies to *T. gondii* thus representing a seroprevalence of 100%. While 11 pigeons had a titre 1:128, five had a titre of 1:64 with a reciprocal range of 64–128.

Seven out of 16 pigeons had antibodies to *C. psittaci* giving a seroprevalence of 43.8%. Two out of seven sera had a titre of 1:256 whereas the remainder had a titre of 1:64.

DISCUSSION

Toxoplasmosis, one of the most common parasitic infections in warm blooded animals, is cited as an important parasitic disease of pigeons (Zwart 1986; Gosbell, Ross & Turner 1990). However, the only definitive hosts are domestic and wild cats (Frenkel 1978; Dubey 1987). The ingestion of undercooked meat containing tissue cysts or oocysts from feline faeces are the two major modes of post-natal infection with *T. gondii*. The finding of high titre antibodies to both *T. gondii* and *C. psittaci* in domestic pigeons was strongly suggestive of contamination of the pigeon feed with *Toxoplasma* oocysts infective material from cases of toxoplasmosis. Authors in other countries have also demonstrated antibodies to *T. gondii* in pigeons (Ibrahim, Hassanin, Aly & Abdel 1995).

Avian chlamydiosis (ornithosis and psittacosis) is a significant disease of Columbiformes and is also a serious zoonosis (Kaminjolo, Tikasingh & Ferdinand 1988; Gosbell *et al.* 1990; Rajesh-Chahota, Joshi & Chahota 1997). A variety of pathological lesions have been described in affected pigeons (Forsyth & Beddome 1981).

In the present study, high titre antibodies to *C. psittaci* ranging from 1:64 to 1:160 were obtained using the complement fixation test. A seroprevalence rate of 43.8% was obtained in the domestic pigeons in Sebele location, Botswana. This seroprevalence rate is relatively higher than that reported for feral pigeons in Japan (Fukushi, Itoh, Ogawa, Hayashi, Kuzuya, Hirai & Shimakura 1983; Chiba, Arikawa, Kakashima & Hashimoto 1984). In the Japanese studies antibodies to *C. psittaci* were demonstrated in only half of the pigeons from which the chlamydial organisms were isolated. Reports of avian chlamydiosis in species other than the pigeons have been cited (Ander-

son 1992; Arzey & Arzey 1990; Arzey, Arzey & Reece 1990).

Close association between pigeons and the human population may predispose the latter to zoonotic infections (Kaminjolo *et al.* 1988). In the present study, it is possible that the pigeons contracted these organisms from the homesteads in which cats were kept. Pregnant women are in great danger of acquiring chlamydial infections from infected animals (Eddy & Hyna 1986) and a fatal automobile crash has been found to have been caused in a person suffering from cerebral toxoplasmosis (Gyori & Hyna 1998). Because the pigeons carry *T. gondii* and *C. psittaci* without manifesting obvious signs of disease, they may be considered as a potential source of infection to pigeon keepers and veterinarians, particularly those who are suffering from immunosuppression caused by the human immunosuppression virus. The public health implications of these findings should be communicated to the public at large.

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