



RESEARCH COMMUNICATION

Presence of antibodies to canine distemper virus, canine parvovirus and canine adenovirus type 1 in free-ranging jackals (*Canis adustus* and *Canis mesomelas*) in Zimbabwe

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ABSTRACT

SPENCER, J.A., BINGHAM, J., HEATH, R. & RICHARDS, B. 1999. Presence of antibodies to canine distemper virus, canine parvovirus and canine adenovirus type 1 in free-ranging jackals (*Canis adustus* and *Canis mesomelas*) in Zimbabwe. *Onderstepoort Journal of Veterinary Research*, 66:251–253

A survey of free-ranging jackals (*Canis adustus* and *Canis mesomelas*) in Zimbabwe was conducted to determine the prevalence of serum antibodies to canine distemper virus (CDV), canine parvovirus (CPV) and canine adenovirus type 1 (CAV-1). Sera from 16 *Canis adustus* and 22 *Canis mesomelas* were collected from 1990 to 1993 from various regions of Zimbabwe and assayed by means of immunofluorescent techniques. Seroprevalence in *C. adustus* and *C. mesomelas* respectively were 50% and 63,6% for CDV, 12,5% and 18,2% for CPV and 37,5 and 9,1 for CAV-1. These results demonstrate that jackals are infected with these viruses and may act as reservoirs of them, although their susceptibility to the viruses is not known.

Keywords: Canine adenovirus type 1, canine distemper virus, canine parvovirus, *Canis adustus*, *Canis mesomelas*, jackal, serological survey, Zimbabwe

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INTRODUCTION

Two species of jackals occur in Zimbabwe: the side-striped jackal (*Canis adustus*) and the black-backed jackal (*Canis mesomelas*). *C. adustus* occurs throughout most of the country but is dominant in the northern areas, while *C. mesomelas* occurs in the drier central, western and southern regions of the country (Bingham, Foggin, Wandeler & Hill 1999). Jackals are major vectors of rabies in Zimbabwe, with 25% of reported cases occurring in the two jackal species (Bingham *et al.* 1999). Few studies have been conducted to determine which other infectious diseases jackals are affected by, although antibodies to distemper virus and parvovirus have been detected from jackals (*C. mesomelas*, *C. adustus* and *Canis aureus*) from Kenya (Alexander, Kat, Wayne & Fuller 1994).

This study was conducted to determine the prevalence of antibodies to canine distemper virus (CDV),

canine parvovirus (CPV) and canine adenovirus type 1 (CAV) in the two species of jackals in Zimbabwe.

MATERIALS AND METHODS

Blood samples were collected by needle aspiration from the heart of jackal carcasses recently killed by cyanide-loaded humane coyote getters (Humane Coyote Getter Inc., Pueblo, Colorado, USA) during jackal culling operations conducted from August 1990 to September 1993. All sampled jackals were adults and appeared in good health. The samples were collected from the Mwenezi area in the southern part of Zimbabwe, Wedza and Rusape in the eastern-central region, Norton in the centre and Karoi in the north.

Antibodies to the three viruses were determined by indirect fluorescent antibody (IFA) techniques. Antibodies to CDV were assayed by means of a commercially produced IFA test kit (VMRD Inc., Pullman, Washington, USA) as described elsewhere (Spencer & Burroughs 1992). Antibodies to CAV-1 were assayed using a field isolate to infect MDCK cells (ATCC CRL No 6253, normal canine kidney) for use as antigen (Spencer 1991). Antibodies to CPV were detected using a field isolate of CPV grown on A72 cells (Walter Reed Army Institute of Research, Washington). For the latter test cells were harvested by trypsinisation 5 d post infection, washed three times in phosphate buffered saline (PBS), mixed with an equal amount of uninfected A72 cells and air dried onto multi-well slides (3×10^3 cells per well). The slides were fixed in chilled acetone for 10 min, dried and stored at -20°C until used. The cells were covered with 20 μl of serum diluted 1:10 and 1:100 in PBS and incubated in a humid chamber at 37°C for one hour. The slides were then washed three times in PBS, air dried and covered with a 1:100 dilution of fluorescein isothiocyanate (FITC) conjugated anti-dog IgG (Serotec, Oxford, UK). They were then incubated for a further one hour, washed and dried as before and mounted in buffered glycerol. The cells were examined for specific reactivity using a fluorescence microscope and the fluorescence was graded from a weak to 3+ reaction. Any reaction above a 1+ reaction at a 1:10 dilution was considered positive. The positive control consisted of serum from a hyper-immune dog.

RESULTS

Table 1 indicates the numbers of jackal sera which had significant antibody levels. The sera which were positive were not focused within any particular locality or year. Rather, all the sampled areas over the entire 3-year time period contained positive sera for each of the diseases tested.

TABLE 1 The number and percentage (in brackets) of the two species of jackals with significant (a 2+ or 3+ reaction at a serum dilution of 1/10 or any positive reaction at 1/100) antibody levels for canine distemper virus (CDV), canine parvovirus (CPV) and canine adenovirus type-1 (CAV-1)

Species	CDV	CPV	CAV-1	Total sera
<i>Canis adustus</i>	8 (50)	2 (12,5)	6 (37,5)	16
<i>Canis mesomelas</i>	14 (63,6)	4 (18,2)	2 (9,1)	22

DISCUSSION

This study demonstrated that *C. adustus* and *C. mesomelas* in different populations within Zimbabwe had antibodies to CDV, CPV and CAV-1. Both jackal species demonstrated antibodies to all three viruses. A similar survey involving Kenyan jackals demonstrated prevalences of 9% and 34% for CDV and CPV-2 respectively (Alexander *et al.* 1994).

Jackals of both species therefore appear to become infected with these viruses and to mount immune responses against them. However, the clinical or pathological response of jackals to infection is not known. To the authors' knowledge there is no literature reporting confirmed clinical cases of any of these diseases in jackals under natural condition, although one report exists of an unconfirmed fatal parvovirus infection in a captive *C. adustus* (Turton 1990).

CDV and CAV-1 have been reported in a variety of species of the Order Carnivora (Appel 1987a, b), whilst CPV appears only to infect canids (Appel & Parrish 1987). The presence of these viruses in jackal populations may have important implications for other susceptible hosts. Jackals, together with other canid species, may act as reservoirs of these viruses and may transmit the diseases to other species. For example, canine distemper has been reported to cause devastating disease in the endangered African wild dog (*Lycaon pictus*) (Alexander, Kat, Munson, Kalake and Appel 1996) and lions (*Panthera leo*) (Roelke-Parker, Munson, Packer, Kock, Cleaveland, Carpenter, O'Brien, Pospischil, Hofmann-Lehmann, Lutz, Mwamengele, Mgasa, Mchangepa, Summers & Appel 1996) and it is thought that transmission was from a canid reservoir host.

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