

## Avian Pox in Turkey Vulture (*Cathartes aura*)

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Avian pox (Avipoxvirus), a widespread viral avian infectious disease, has been found to affect around 2.5% of living bird species (Bolte *et al.* 1999, van Riper III & Forrester 2007). Twenty three species of diurnal and nocturnal birds of prey have been reported infected with avian pox (van Riper III & Forrester 2007, Vargas *et al.* 2011), these include Turkey Vulture *Cathartes aura* and Andean Condor *Vultur gryphus* (Forrester and Spalding 2003, Kim *et al.* 2003). Avian pox infection is expressed in two forms: the diphtheric form affects the respiratory and digestive track with high mortality rates, and the cutaneous form which produces lesion on the featherless areas of the body and shows low mortality rates

(Bolte *et al.* 2009). The cutaneous form is the most common in raptors and it is characterized by skin nodules and papules (Jones 2006, Hudelson & Hudelson 1995).

On 18 December 2008, an unsexed hatchling year Turkey Vulture *Cathartes aura meridionalis* was captured for wing-tagging on San Francisco, Zulia state, Venezuela (10°32'15"N, -71°38'10"W). Nodular cutaneous lesions were observed on the head (Figure 1A). Sections of the skin were removed and fixed in 10% buffer formalin and submitted to Laboratorio de Diagnostico Patologico Veterinario in Maracaibo, Venezuela, for histologic examination. All tissue samples were embedded in paraffin and stained with haematoxylin and eosin for

**Figure 1.** Cutaneous lesions in a hatchling year Turkey Vulture *Cathartes aura meridionalis*. Photos by Adrián Naveda-Rodríguez.



histopathological examination and were examined with a light microscope. Because we were not managing the population of Turkey Vultures, the bird was released after tissue samples were collected.

There were three nodules yellowish-brown (Figure 1B), round and firm, measuring 6.5 to 12 mm. The cut surface was creamy white. Histopathological examination revealed hyperplastic epithelium with marked globose degeneration and keratinocytes colliquative necrosis, intracytoplasmic eosinophilic inclusion bodies, dermis infiltrated with heterophils and lymphocytes. On the basis of the presence of Bollinger bodies and characteristic ballooning of epithelial cells a diagnosis of poxvirus infection was made (Cooper 2002, van Riper III & Forrester 2007).

Avian pox was previously reported in *Cathartes aura septentrionalis* (Forrester and Spalding 2003), a subspecies wintering in south-east of North America (Kirk and Mossman 1998), this report was diagnosed in three nestling Turkey Vultures in Florida (USA) during the breeding season of 1978 and correspond to the diphtheritic form. To our knowledge this is the second report of avian poxvirus infection in Turkey Vultures

and the first documented record of cutaneous form of avian poxvirus in Turkey Vulture in South America; two more individuals (aged as second year birds, *sensu* Henckel 1981) with similar cutaneous lesions were observed in the same locality on 28 November 2008 (Figure 2A) and 21 January 2009 (Figure 2B), unfortunately we were not able to capture them; these birds correspond to the subspecies wintering in South America, *Cathartes aura meridionalis* (Kirk and Mossman 1988).

Avipoxvirus infections are reported more often during migration season (fall and winter months) when there are highest host densities and among them large numbers of young birds (van Riper III & Forrester 2007); our findings are consistent with this statement. Avian pox, as an emerging disease, is of concern for the management and conservation of Turkey Vulture populations because of its epizootiology. Avipoxvirus transmission is host density-dependent and can deplete animal populations (Smith *et al.* 2009). Roosting behaviour of Turkey Vultures could facilitate an avian pox outbreak with undesirable consequences, particularly in wintering grounds such those in Zulia State in Venezuela where more than



**Figure 2.** Cutaneous lesions in second year Turkey Vulture *Cathartes aura meridionalis*. Photo: A) Rafael López, B) Adrián Naveda-Rodríguez.

400 individuals have been observed roosting in telecommunication towers.

Little is known about infectious diseases in New World scavengers, and few reports have been done from cases detected before 1990. Turkey Vultures and Black Vultures *Coragyps atratus* have been found as hosts of Avian Malaria, Venezuelan Equine Encephalitis and West Nile Virus (WNV) (Aguirre *et al.* 1992, Forrester and Greiner 2008, Komar *et al.* 2003, McLean and Ubico 2007). Infectious diseases such those mentioned here are significant diseases affecting avian diversity. For example, Avian Malaria has been

found affecting the fitness of infected birds (van Riper III *et al.* 1986, Knowles *et al.* 2010). Declines of wild bird populations (including a scavenger species) and subsequent reduction of geographic range are driven by Avipoxvirus and WNV (LaDeau *et al.* 2007, van Riper III *et al.* 2002, van Riper III & Forrester 2007). The epizootiology and impact of these diseases, as well as other infectious diseases, on vultures is widely unknown, so there is an urgent need to monitor for them in vultures.

As stated by Deem *et al.* (2001), health assessments by means of monitoring diseases constitute a baseline for population viability

analysis of species. This data will allow comparing the same population in future years and comparison among different populations. Understanding population health will assist conservation biologists to manage individual populations with specific needs. Identifying infectious diseases in a population would inform environmental managers and decision-makers about land management and specific management techniques for the affected populations. Rigorous studies on the prevalence of pathogens and their effects on the

demography of raptors have been suggested (Saggese 2007). Therefore we encourage raptor researchers in the Neotropics to extend their observation efforts to vultures in order to understand better the impact and interaction of human activities and environmental changes on vulture populations. Research topics could include the interaction of vultures with domestic animal facilities (e.g. poultry farming, cattle ranching) and the movement ecology of vultures to track environmental changes and dispersal routes of birds and their pathogens.

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