

## CASE REPORT: SEVERE PARASITOSIS IN A WILD ROADRUNNER (*GEOCOCCYX CALIFORNIANUS*) IN MEXICO

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**Abstract:** A wild roadrunner (*Geococcyx californianus*), a two-year-old male was found dead on a road in the municipality of Piedras Negras, Coahuila de Zaragoza State, Mexico. Upon external inspection, the presence of a female tick of the genus: *Amblyomma inornatum* and numerous lice of the genus: *Menopon sp.* Histopathology revealed ovoid parasitic structures within the enterocytes, corresponding to parasites of the genus: *Eimeria sp.*, as well as nematode eggs in the coproparasitoscopic examination. In the blood smears, numerous ovoid and round structures were observed in the cytoplasm of the erythrocytes, next to their nuclei, which corresponded to microorganisms of the genus: *Aegyptianella spp.* To our knowledge, the case described in this document is the first report of severe parasitosis in a wild roadrunner in Mexico.

**Keywords:** Roadrunner, *Amblyomma inornatum*, *Menopon sp.*, *Aegyptianella spp.*

## INTRODUCTION

Egyptian tinea nellosis is a tick-borne febrile disease caused by *Aegyptianella spp.*, a rickettsia of the family: *Anaplasmataceae*. Microorganisms appear as single or multiple, round, "ring-shaped" (0.5-4µm) or irregular oval bodies within the erythrocytes, often lateral to the cell nucleus [1]. These inclusions are stained with the Romanowsky method. [16]. *Aegyptianella spp.*, was first described by Carpano in 1929 in a group of chickens and geese in Egypt [3]. Inclusions similar to *Aegyptianella spp.*, have been observed in other parts of Africa, Asia, Europe, North and South America. Multiple bird species are susceptible to this agent. [2] [3]. *Aegyptianella spp.*, is transmitted mainly by ticks of the genus: *Argas spp.*, although it can also be transmitted by blood inoculation [1] [4] [5]. The main clinical symptoms of acute Aegyptianellosis are weakness, fever, anemia,

anorexia, diarrhea, pale discoloration of the legs, staggered gait, jaundice, ruffled feathers and high mortality in younger infected birds [6]. The animal shows anemia, leading to right-sided heart failure and ascites, enlarged liver and spleen, discolored and dilated kidneys, as well as serous hemorrhages.

This disease is accompanied by *Borrelia sp.*, during infestation by this type of ticks, which can also cause toxicity, paralysis, irritation, allergies, blood loss and have a very important role as reservoirs of pathogens. [1] [7]. The family: *Argasidae* is divided into four genres: *Argas*, *Carios*, *Ornithodoros* y *Otobius* [7]. Most ticks living in poultry houses belong to this family. The most important genera in the classification of hard ticks are: *Amblyomma*, *Boophilus*, *Dermacentor*, *Haemaphysalis*, *Hyalomma*, *Ixodes* y *Rhipicephalus*. There are at least 129 species of ticks in the genus: *Amblyomma*, which are characterized by having elongated mouthparts and usually an attractive coloration [7]. *Amblyomma inornatum*, it is a little-known tick that is generally found in southern Texas, it lacks the typical white shield ornamentation present in the other five species of this genus, which are the most common in North America [8]. Regarding lice that affect birds, mainly those of the genus *Menopon sp.*, they are considered lice of the order (*Phthiraptera*), suborder (*Amblycera*) and family (*Menoponidae*).

They are classified as chewing lice, which mostly affect poultry and migratory birds [9] [10]. They measure approximately 2 to 3 millimeters in length, are dorso-ventrally flattened and wingless, have a large, round head, with small or absent eyes, and have three pairs of articulated legs and a pair of short antennae. The first two segments of the thorax are visible, the only pair of thoracic spiracles is on the ventral side of the mesothorax, usually there are six pairs of abdominal spiracles, the three pairs of legs are weak and thin,

usually bird lice have two claws on each leg. They have mandibulated parts, composed of a labrum, a pair of mandibles and a pair of maxillae literally attached to the lip, which are cut into a simple wide plate. These mandibles are parallel to the ventral surface of the head and are cut into a horizontal plane. There is a pair of maxillary palps, which have two to four segments [11].

These lice usually feed on keratin fragments in the skin and feathers and possess gut symbionts or specific enzymes for digestion. However, they will drink blood that oozes from scratches in the skin and some may puncture the skin. Birds attempt to remove lice by preening, scratching their heads with their feet and grooming their bodies with their beaks. Infestation can cause severe irritation, which can lead to feather damage, restlessness, appetite disruption and birds may pluck their feathers. Weight loss and possibly death can occur. Infestation is especially common in young, feathered birds, barn-confined or free-range birds [12].

## MATERIAL AND METHODS

A wild roadrunner was sent to the Department of Pathology of the FMVZ of the UANL (*Geococcyx californianus*), a two-year-old male was found dead on a road in the municipality of Piedras Negras, Coahuila de Zaragoza State, Mexico. The necropsy revealed a regular physical condition and pale mucous membranes. A female tick of the genus was found on the neck.: *Amblyomma inornatum*, ovoid in appearance, grey in colour with whitish areas and hard consistency [7] [8]. (Figures 1 and 2).



Figure 1: Presence of a tick in the neck region of the roadrunner.



Figure 2: Tick of the genus: *Amblyomma inornatum*, seen in the stereoscopic microscope.

Numerous grayish-brown lice belonging to the genus were observed in the dorsal region: *Menopon* sp. [10] [11]. (Figure 3).

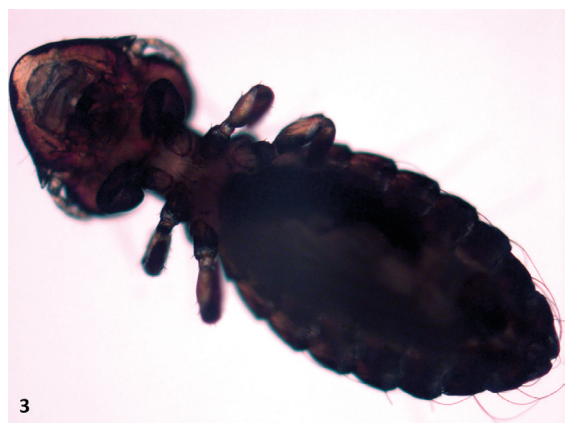


Figure 3: Louse of the genus: *Menopon* sp., seen in the stereoscopic microscope

Both ectoparasites were identified using a Zeiss Stemi-2000C stereoscopic microscope. In the thorax, the lungs showed moderate diffuse congestion, in the digestive system, the gizzard was plethora, while in the intestinal mucosa numerous petechial hemorrhages were observed. The coproparasitoscopic examination based on the flotation test and observed using a Zeiss Primo-Star optical microscope, revealed insect remains, pollen grains and nematode eggs [17]. (Figure 4).

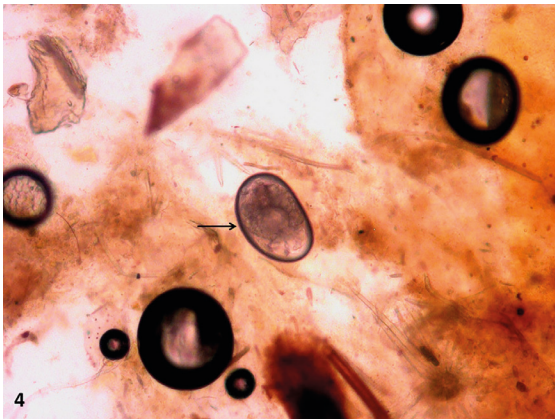


Figure 4: Presence of nematode eggs in coproparasitoscopic examination.

Microscopically, a moderate diffuse pulmonary congestion, a moderate diffuse hepatic congestion, a lymphoplasmacytic infiltrate in the intestinal mucosa with lymphoid hyperplasia in the enteric lymphoid plaques, as well as a lymphoplasmacytic infiltrate in the kidney were observed. The complementary test performed for the blood smears was Romanowsky histochemistry [16]. Where ovoid and round structures were observed in the cytoplasm of numerous erythrocytes next to their nuclei, which corresponded to microorganisms of the genus: *Aegyptianella* spp. [1] [3] [6]. (Figure 5).

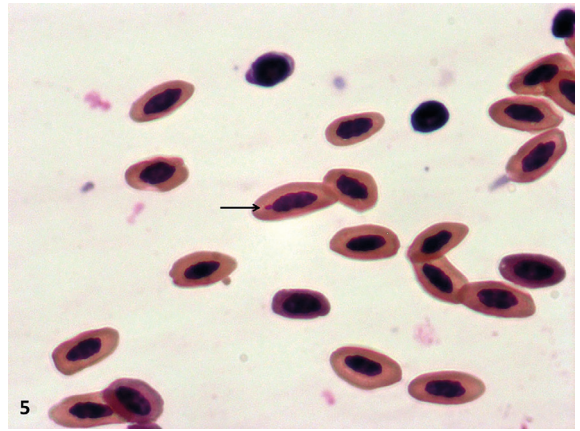


Figure 5: Presence of an intracytoplasmic ovoid structure, compatible with *Aegyptianella* spp.

## DISCUSSION

Despite the scarce information regarding the incidence of diseases that this species develops during its life cycle, the knowledge generated in this case will allow us to understand and propose new research regarding the diseases that these birds develop and that are possible causes of death [8]. It is known that animals in captivity, when losing 10% or more of their body weight, can begin to show clinical signs of disease. Therefore, it is recommended to carry out a preventive health plan, which includes: a) an annual physical examination with the performance of blood counts and blood chemistries, b) coproparasitoscopic flotation and McMaster examinations twice a year, c) taking of full body x-rays, d) vaccination against the West Nile virus in endemic areas and e) continuous review of the diet [13]. Currently, some infectious diseases have been documented, involving viral, bacterial, fungal and parasitic agents, which affect roadrunners [13]. Of the latter, the presence of some external parasites has been described, such as fleas of the genus: *Echidnophaga gallinacea*, affecting the face and periocular region, as well as some internal parasites, such as *Giardia* sp., and some avian nematodes [13]. As well as non-infectious diseases, highlighting some traumatic processes,

due to the ingestion of foreign bodies such as the cockle fruit (*Xanthium strumarium*) [14] and a Texas horned lizard (*Phrynosomatidae*) [15]. With this information, we have elements to implement disease control programs in this species, as well as discover other diseases that have not yet been reported.

## CONCLUSION

Very little is known about the different diseases that affect this species, however, the finding of multiple parasites in this bird is indicative of the prevalence and infestation suffered by roadrunner populations in the wild. Therefore, further studies are needed to determine the presence and prevalence of the different diseases that affect these birds, transmitted by these vectors. To our knowledge, this is the first report of a severe parasite infestation in a wild roadrunner in Mexico.

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