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Brown necked raven (*Corvus ruficollis* Lesson, 1831) electrocution by power lines in a semi-urban area in Timimoune (Southern Algeria)

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ABSTRACT

Electrical infrastructures are considered as a remarkable anthropological pollution in natural sites. Electrocution is one of the most mortal causes of birds. It occurs when they perch on a conductive metal pylon, being in simultaneous contact with a cable or through birds contact with two wires. In this study, we reveal this problem in a semi-urban hyper-arid region in Southern Algeria. The screened site is a discharge of Timimoune city that contains a big web of electric structures. Herein, we signal a big number of brown necked raven carcasses, most likely killed by electrocution.

Keywords: Corvids, Electric danger, Threatened avifauna, Sahara, North Africa.

Graphical abstract

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1. Introduction

Birds' electrocution is one of the most alarming problems worldwide. As birds diversity is one of the bioecologists' priorities since the beginning of web-electricity development and spreading in natural area during the last century. Birds electrocution occurs when a bird comes in contact with two wires or when it perches on a conductive metal pylon, being simultaneously in contact with a cable [1]. According to the International Association for Falconry and Conservation of Birds of Prey [2], electrocution is now the most important cause of mortality for a big number of endangered species. It'scan be especially severe for globally threatened predators and scavengers. Mortality by electrocution is limiting factor for birds' distribution within ecosystems [3]. Every year, power line electrocution causes the death of thousands of mostly large-bodied birds from endangered species [4, 5]. Thus, most of studies about electrocution involved lists of dead animals found under electricity poles [6, 7, 8]. According to Tinto et al [9], large-bodied birds such as raptors and ravens are the most threatened by electricity Electric-Utility Structures occur widely in both natural and human-dominated landscapes and are often used by birds for nests construction. They can cause power outages, fires, and birds' electrocution, particularly if nests occur directly above energized equipment and incorporate metal wire [10]. In Algeria, the brown necked raven seems to be largely affected by electrocution. This species is considered as a useful bird in organic material degradation, being known as a scavenger bird [11]. Herein, we investigated the high-voltage electric towers threat on the Brown-necked raven, a common species of the big Sahara.

2. Materials and Methods

The investigations were realized in 2015 at the region of Timimoun's discharge in the center of the Algerian Sahara. Unfortunately, a big number of dead birds of the same species was observed at the same region, especially under the electric structures. Thus, the same area, characterized by the large number of high-voltage power lines (HVPL), was investigated to determine the impact of HVPL on the Brown-necked raven mortality (about 60 ha: 29° 15'N 0° 14'E) (Fig. 1a).

3. Results and Discussion

Both resident and migratory birds consider electric pylons as an ideal place to build nests and roost for rest or to find preys. In fact, birds prefer high sites to protect themselves against natural enemies.. However, the high electrical tension of such places can threaten them and cause their death or the one of their young fledged (Fig. 1b). .

This study is considered as the first data about the brown necked raven electrocution in Algeria. However, in Saudi Arabia for example, the Brown-necked raven is listed as electrocuted species in the work of Shobrak [12]. Birds use power lines frequently. Though, raptors are widely recognized for their use of Electric-Utility Structures. Other species of Corvidae also nest on electric structures: Common ravens (*Corvus corax*) nest on utility structures in North Africa [13], Asia [7], Europe [14], and North America [15]. Moreover, magpies (*Pica hudsonia* and *Pica pica*) were found on utility structures in North America, Europe, and Asia [16,17,18,19] while Hooded crows (*C. corone*) and Carrion crow (*C. cornix*) nest on utility structures in Europe [6,17] and Chihuahuan ravens (*C. cryptoleucus*) roost on utility structures in North America [20]. Finally, Fan tailed raven is signaled as electrocuted bird in Asia [8].

In Algeria, Raptors, Storks and Ravens are among the species that use the electricity pylons, they can even coexist on the same pylon [13, 21]. According to our investigation, ravens (Brown-necked raven and the Common one) build nests especially on metal pylons, but rarely on trees. The Brown necked raven visits the discharge site of Timimoun to eat and perch on electric structures [11]. Such human constructions influence bird's behavior and represent a big danger to the brown necked raven. In this investigation, about 15 bodies of Brown-necked raven were found under the different electrical constructions of the studied site. It's important to mention that some raven bodies were found with a pupa in their beaks (Fig1c), which could explain the bird's sudden death and argument the fact that electrical shock is the most probable reason.

Figure 1 – Brown-necked raven Electrocution close to discharge of Timimoune
(a) General view of the study region; (b) electrocuted Brown necked raven in February 2015; (c) Pupa in the beak of the electrocuted raven.

4. Conclusion

This case report is, at the first place, a kind of alarm, to ecologist and authorities to take in consideration birds' electrocution as one of the most important problems to avoid birds-populations' disorder, where some species, such as the brown necked raven, play a major role in their own ecosystems. It's important to mention that procedures are being taken in many countries to mitigate this cause of death and decrease the human influence on the fauna especially birds. At the second place, we also aim to declare the potential risk of birds' nests on the electrical construction, causing loss of electricity on a large scale and important economic damages in some cases.

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