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Atelerix Algirus Ectoparasites of El-Kala National Park (Algeria)

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Abstract. The entomological study of the *Atelerix algirus* ectoparasites study was conducted in the national park of El-kala. It is situated in the extreme northeast of Algeria. For the current study, eleven individuals were captured alive during the years 2010-2012. Samples were rich in parasites; we identified acaridans; two tick species: *Ixodes ricinus* and *Ripicephalus sanguineu*. And a most important abundance noticed by the dipteral *Archeopsylla erinaci*. Among the eleven hedgehogs captured we had recover more than two hundred ticks and forty-three fleas.

Keywords: Hedgehog, *atelerix algirus*, ectoparasites, tick, Algeria.

1. Introduction

Mammalian's wild in Algeria, like everywhere, interact with Man either positively or negatively to each other. For a long time, hedgehogs were persecuted ,massacred ,destroyed, for their flesh, skin, fat, their head, legs, or any other parts of their body, they were killed, often suffering a lot . This has notably affected their abundance. That is why the hedgehog of Algeria is widely protected in many territories such as the French tone (ministerial decision of april17th 1981) it is recorded in the annex 2 of Berne agreement. It is thus forbidden to kill it, mutilate it, capture it, and catch it, to disturb it intentionally, or to naturalize it, as well as destroy, alter, or regressing its environment, whether dead or alive. If the *Atelerix algirus* virtues are proved, would a simple decree protect it? Here comes the idea of studying the hedgehog of Algeria as a source of zoonoses.

2. Study Zone Presentation

This study was conducted at El-kala National Park (E.K.N.P.). Created in 1983, it is situated in the extreme northeast of Algeria. Its surface is 80000 ha, bordered by the Mediterranean Sea by the north and the Tunisian frontier by the east, there are many lakes, it is a unique ecosystem in the Mediterranean basin. The park was classified on the national patrimony list and a biosphere's reserve by the UNESCO in 1990 (Fig. 1) [1].

3. Work Methodology

First we selected many capture sites in the El-kala national park of, where many traps and cages were put (Fig. 2), a daily visits were paid to check the traps, since capture, the animal was transported alive to the laboratory to take off parasites. The collected samples were separately conserved in tubes containing alcohol 70 °. Recovered parasites were identified at Pasteur Institute of Algeria according to identification keys.

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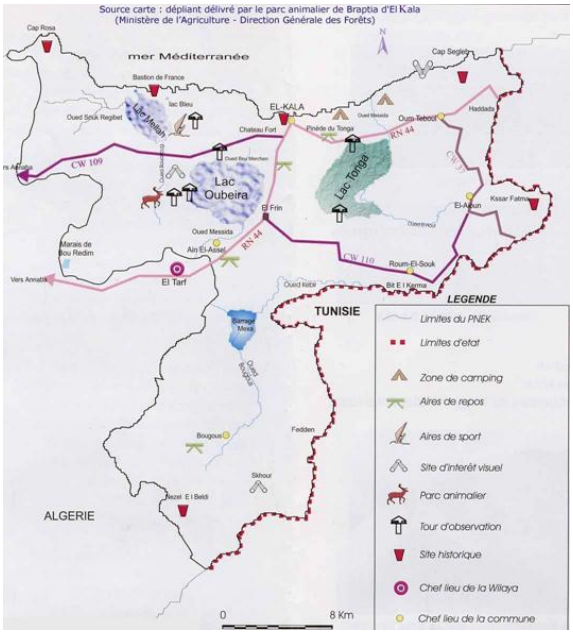

Fig. 1: The study zone localization (picture source: the park management).

4. Results

The El-kala national park hedgehog of Algeria are very rich in parasites (Fig. 3) among the eleven hedgehogs captured we had recover more than two hundred ticks and forty-three fleas. The number of ticks on only one individual would overcome one hundred; all belong to the same species of dipteral: *Archeopsylla erinacei* (Fig. 4) all the fleas were localized on the back or head, none on the baily. We did not find flea larva on the animal.

Fig. 2: *Atelerix algirus* of El-Kala National Park

Fig. 3: Hedgehog of Algeria very rich in fleas

The baily of the hedgehog, the only zone not dwelt by fleas, was parasite with ticks. Under the binocular magnifying glass, we identified two species of ticks *Ixodes ricinus* (Fig. 5) and *Ripicephalus sanguineu* (Fig. 6).

Fig. 4: A: Male flea of the hedgehog *Archeopsylla erinacei* observed under a binocular glass. B: *Archeopsylla erinacei* on the head of hedgehog of Algeria.

Fig. 5: Nymph of *Ixodes ricinus*. A: ventral view, B: dorsal view

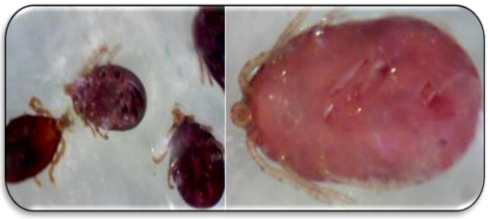

Fig. 6: nymph of *Ripicephalus sanguineu*. A: ventral view, B: dorsal view

5. Discussion

Experimental studies have shown that the parasites influence the reproduction period of the hosting animal as well as his reproductive effort [2]-[4]. In response the hosting animal adapts many mechanisms to fight to reduce their impact [2], [5]. These mechanisms are behavioral and immunitary (antibody and toxic substances combination able to reduce the parasites impact). Besides the virulence of parasites and their pernicious effects would be higher in the species that exploit their hosts during a short period [6].

The impact of ectoparasites can differ according to the hosting species of the parasites and/or the environment [7]-[10].

Our findings show that the hedgehog of Algeria sampled at El-kala national park is much infested rather in richness than in diversity, for one hundred per cent of hosting samples shelter more than one hundred parasites belong to one of the three species. In fact, after taking parasites off, we identified three species of ectoparasites: Ticks are *Ixodes ricinus* and *Ripicephalus sanguineu*, besides to the fleas and every jumping *Archeopsylla erinacei*. From the abundance side flea species is evidently the most prevailing, and are followed by *Ixodes ricinus* then *Ripicephalus sanguineu*. That goes in the same sense of the results by Khaldi et al. in Algeria [11] done on the same biological model in another distant city about 500km from our study zone and in a completely different habitat.

The current study reveals a cocktail of ecoparasites. Blondel [12] says that two species having the same ecological niche cannot co-exist. This is the classical theory of interspecific completion. Our three ectoparasites species share the same host, the body of the hedgehog, and the same nutrition resource (the blood of the host), thus we suppose that the niches are not completely superimposed, in fact, fleas and ticks do not parasite the same parts of the body of the hedgehog, fleas took the external part of the body if we consider that the hedgehog is on ball form and ticks the internal part and this on all the collected samples. Or the co-existence of competitors can be stable by an external phenomenon.

The tick's presence is not accidental, and is certainly due to the localization on our study sites. In fact we have worked in one of the most humid zones of Algeria. Taking into account that the hedgehog is

humicolous and the tick's hygrophilous, the infestation of our sample by this parasite is in practice evident [13], and humidity is the static factor of survival that characterizes the biotope of ticks.

These parasites are vectors of veterinary and human diseases as they do not have an impact on their corporal conditions. In fact these parasits transmit a spirochete of *Borrelia burdorfera* causing the Rickettesia [14]-[17]. The persistence of pathogenicity of the Borrelia is endemic to the host's reservoirs that are mammals and birds middle- sized [14], [18]. However no study has proved that Borreliosis affected directly the fitness of the host.

Tick itself carrying *Borrelia burdorfera sensu lato*, bacteria responsible of the Lyme disease in humans [19], [20]. These parasites are also vectors of *Coxiella burnetii*, *Anaplasma phagocytophilum* and arboviruses: TBEV, Crimean-Congo, Tahyna, Bhanja…etc. Andmore hedgehogs are reservoir of *Anaplasma phagocytophilum* and could therefore constitute a danger to public health in urban areas [21].

Knowing ecology of the host sample, mainly its size and use of dwellings in the time and space, is essential to understand the epidemiology of these diseases.

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