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Editorial

One Health Bulletin

The effects of climate change: Spreading of zoonotic arthropod–borne diseases in Europe

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Arthropod-borne diseases are emerging infectious diseases frequently reported in humans and animals worldwide. They are caused by bacteria, viruses and protozoa transmitted through the bite of hematophagous arthropods, mainly ticks but also fleas, mosquitoes and lice.

The spread of the pathogens responsible for these diseases is stronghly related to the distribution of arthropod species that depends on several factors: agricultural and wildlife management, deforestation and climatic conditions. In particular, climatic changes, mainly increase of temperature and humidity, caused higher presence of hemtophagous arthropods in large areas of different continents with consequent higher circulation of the microorganisms and presence of new pathogens in new geographic areas.

Ticks of different species harbor and transmit bacteria inducing diseases, in some cases with severe symptomatology, in people and domestic animals. Ticks vectors have increased in density and spread into higher latitudes and altitudes in Europe, thus tick-borne diseases such as Lyme borreliosis and rickettsiosis have been more frequently diagnosed in geographic area where previously they were sporadic. Lyme disease, caused by *Borrelia burgdorferi*, is typical of north Europe, but no sporadic cases have been reported in warmer areas[1].

New *Rickettsia* species appeared in new territories. *Rickettsia (R.) slovaca*, responsible for tick-borne lymphadenopathy disease in humans and typical of central Europe, is now present in mediterranean area; *R. africae*, *R. massiliae*, *R. aeschlimannii*, *R. monacensis* are some examples of agents causing spotted fever diseases in areas where previously *R. conorii* was the only known rickettsial pathogen[2]. Similarly, fleas are the main vectors of *R. felis* and *R. typhi* that are cause of human diseases, characterized by clinical forms often with severe signs, not so rare as supposed.

Monocytic Ehrlichiosis of dogs, originally called tropical canine panleucopenia, is caused by *Ehrlichia canis* and transmitted by ticks, mainly *Rhipicephalus sanguineus*. Currently, *Ehrlichia canis* is largely spread worlwide, including not only tropical territories, but also areas with less warm temperatures[3].

Increasing circulation of mosquitos and appearance of new species are strong examples of the consequence related to the climatic changes.

Mosquitos are largely involved in the epidemiology of arbovirosis, such as West Nile and Usutu diseases that in the past, as suggested by their names, were typical of the humid african areas close to Nile and Usutu rivers, whereas in the last two decades they became severe threats for the human and veterinary medicine in Europe, too, causing encephalitis in people, horses and mortality in birds[4,5].

Wide distribution of hematophagous vectors induced to suppose new epidemiological cycles for zoonosis such as Q fever (by *Coxiella burnetii*), brucellosis, leptospirosis[6–8]. In fact, pathogens not traditionally considered as arthropod-borne microorganisms and usually transmitted through oral and/or inhalatory routes, have been detected in ticks, as well as other hematophagous vectors, with

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increasing frequence.

Climatic changes and, consequently, the epidemiology of several infectious diseases are constantly evolving. For this reason, regular monitoring of the distribution of hematophagous arthropods and related pathogens is fundamental, mainly in view of the One Health concept.

Measures against arthropods and timely diagnosis of these infections in persons and animals are pivotal to successfully fight the diseases.

Conflict of interest statement

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