Foreign species, exotic diseases: How invasive animals create new health risks

Svea Timm, Anne Selles

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Introduction

Invasive species are alien species that are intentionally or unintentionally introduced into new regions and have a negative impact on the ecosystem or humans. In addition to economic damage and implications on native biodiversity, many foreign species carry the risk of disease transmission (Fig 1). They do not only spread already known pathogens, but also introduce new infectious diseases. In view of climate change, this risk in particular is increasing, as a warmer climate not only favors the establishment of vector species but also the multiplication and spread of pathogens.

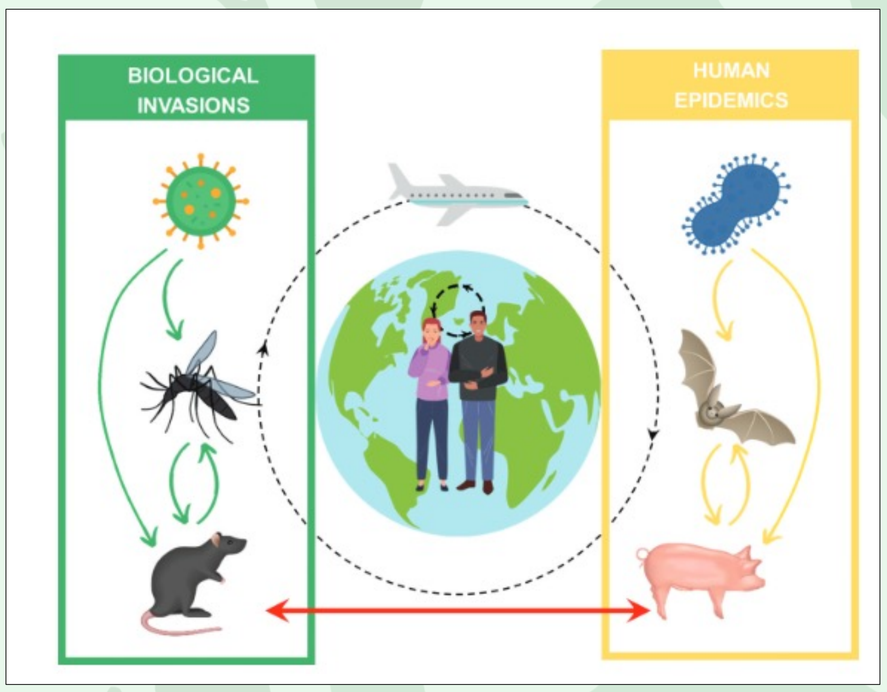

Fig 1: Interaction between invasive species, pathogen transmission and infectious diseases (Vila et al. 2021).

Results

The raccoon is one of the best-known invasive species in Central Europe and is often considered a native species. As a highly competitive omnivore with barely any natural enemies, there are hardly any regions in Central Europe where it has not yet established itself. Raccoons carry the risk of zoonotic disease transmission. For example, the pathogen *Baylisascaris procyonis* is harmless to raccoons but potentially fatal to humans.

Furthermore, a warmer climate in Europe enables the establishment of vector insects while also promoting the multiplication of pathogens in the insect. The extrinsic incubation period, the time between the uptake of the pathogen by the insect and infection maturity, decreases with increasing outside temperatures. Mosquitoes of the genus *Aedes* potentially transmit the Zika, yellow fever, chikangunya and dengue viruses. In the past, these infectious diseases mainly occurred in tropical countries. In recent years, there has been an increase in regional mass outbreaks in Europe due to a continuing northward expansion of *Aedes* mosquitoes (Fig 2).

Discussion

Zoonotic diseases pose a significant and increasing threat to us humans. To effectively control the proliferation of invasive species, a framework of laws and guidelines has been established, exemplified by the EU animal health law. These regulations emphasize the importance of either proactively preventing the dissemination of invasive species or, in cases where prevention is challenging, implementing essential measures to curtail the spatial expansion of their habitats.

Advanced tools like environmental niche modeling play a crucial role in this effort. By employing these models, experts can forecast potential future habitats based on different climate scenarios. This forward-looking approach empowers authorities to take timely actions, mitigating the potential impact of invasive species and safeguarding ecosystems and human health at the best possible rate.

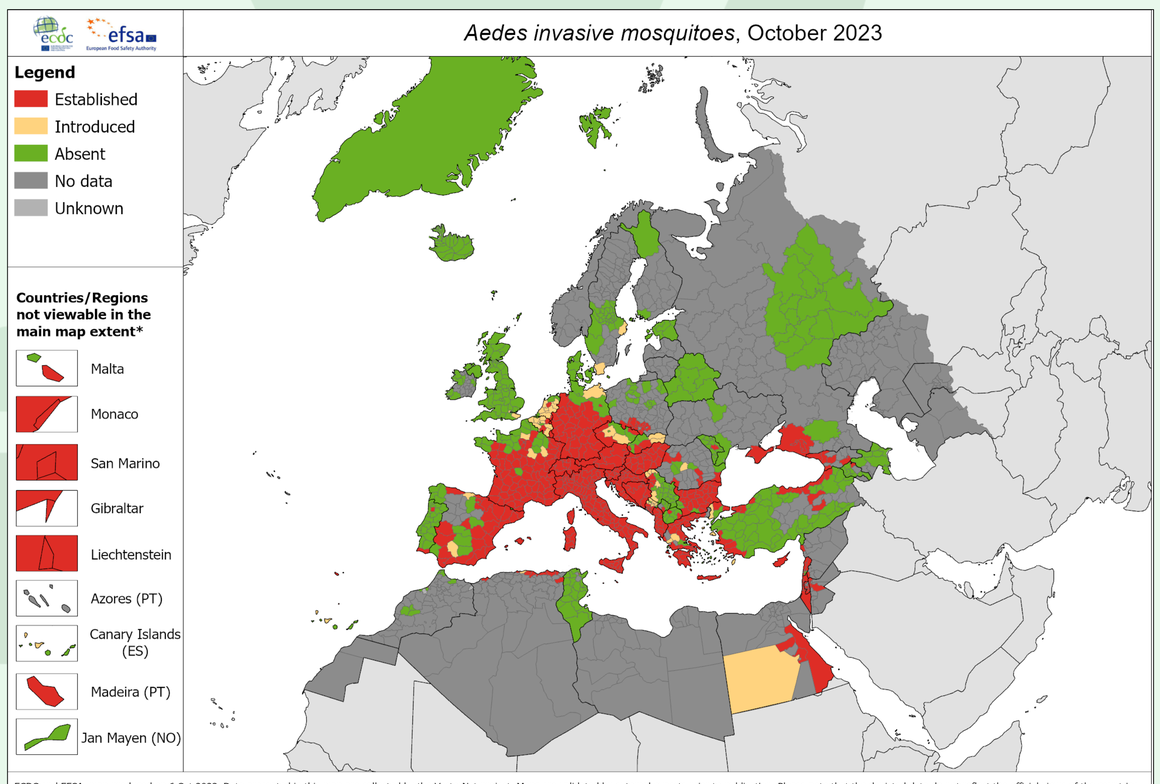

Fig 2: Distribution of *Aedes* invasive mosquitoes in Europe, October 2023 (ECDC 2023).

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Literature

Medlock JM, Leach SA (2015) Effect of climate change on vector-borne disease risk in the UK. The Lancet Infectious Diseases 15 (6): 721-730

Peter N, Dörge D D, Cunze S, Schantz A V, Skaljic A, Rueckert S, Klimpel S (2023) Raccoons contraband - The metazoan parasite fauna of free-ranging raccoons in central Europe. IJP: Parasites and Wildlife, 20: 79-88

Tedeschi L, Biancolini D, Capinha C, Rondinini C, Essl F (2022) Introduction, spread, and impacts of invasive alien mammal species in Europe. Mam Rev, 52: 252-266