Health, zoonotic pathogens and parasites

Golden jackal (*Canis aureus*) in the western Balkan epidemics of *Echinococcus multilocularis*

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Echinococcus multilocularis is a zoonotic tapeworm being responsible for the human alveolar echinococcosis (HAE), a chronic disease, which causes death of the patient in the lack of appropriate treatment. Wild Canidae play the role of definitive hosts in the life cycle of the parasite. Humans acquire infection accidentally and show liver lesions similar to those of the natural intermediate rodent hosts. The potential role of the golden jackal in the maintenance and spread of the parasite was initiated to investigate during the 2010s. Our research group joined this research in 2016. Since then, we have investigated more aspects of the host-parasite interactions between golden jackals and *E. multilocularis*. We compared the prevalence and mean intensity values of red fox and golden jackal, the egg production ability of the two hosts. We also evaluated environmental factors, which can contribute to the maintenance of *E. multilocularis* forming microfoci of the infection. We analysed the interdependence of human and carnivore epidemiology of *E. multilocularis*. Between 2016 and 2024, we investigated 435 golden jackals compared to red foxes (n=291).

We confirmed that prevalence and mean intensity were similar in the two species. Moreover, within some hotspots, the jackal population proved to be at a higher risk of infection. Our study on egg production confirmed the difference between the two hosts, which might cause multiplied risk by their coexistence. Among the environmental factors, wetlands were found to carry higher risk for maintenance of *E. multilocularis*, while annual precipitation and the seasonality of precipitation proved to have local effect on microfocus formation. During the years of investigation, we determined a high-risk cluster of *E. multilocularis* along the Drava River. By analysis of the correlations of HAE cases and the hotspots in wild carnivore, the human health risk due to presence and disease transmission by golden jackals proved to be suspicious. Our findings also support those of studies carried out in Croatia and Serbia, which call attention to the formation of a new *E. multilocularis* high risk area within the western Balkan region.