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A SYSTEMATIC REVIEW AND META-ANALYSIS TO ASSESS THE SIGNIFICANCE OF MICROBIAL INFECTIONS IN ZEBRA

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Abstract

Wild equids can harvest multiple-host infectious agents that are able to affect other wildlife species, but also domestic animals and humans. The contact between wild and domestic equids is constantly increasing due to the depletion of natural areas, climate and land-usage changes, which could result in burdensome epidemics. Nevertheless, currently there is a lack of adequate epidemiological data from zebra. Three electronic databases were searched from 10 to 20 March 2021 for publications reporting bacterial, viral and protozoan infections in zebra. Data for a total of 12 nominal variables were extracted from reviewed papers to undergo a qualitative analysis on microbial infections in zebra. Prevalence-reporting studies were subjected to meta-analysis for estimating the pooled prevalence and seroprevalence of infectious agents in wild zebra populations. We identified 29 pathogen species and the most represented were Equine Herpesvirus 1 and 9, *Bacillus anthracis,* African Horse Sickness virus and *Theileria equi.* They were reported from all the three zebra species, both in captivity and wilderness. Pooled seroprevalences were estimated for the equine Orbiviruses AHSV (70%; 95%CI: 35-96%) and EEV (21%; 95%CI: 8-38%) and for the equine α-Herpesviruses EHV-1 (72%; 95%CI: 43-93%), EHV-4 (40%; 95%CI: 0-100%) and EHV-9 (58%; 95%CI: 9-98%), and pooled prevalences for the equine piroplasms *T. equi* (100%; 95%CI: 94-100%) and *B. caballi* (8%; 95%CI: 0-28%). Zebra is most probably a reservoir from which AHSV, EHV-1 and *T. equi* can be transmitted to horse populations, potentially causing disastrous epidemics. Zebra can also harvest zoonotic pathogens like *B. anthracis, A. phagocytophylum*, CCHFV and *T. brucei.* Other agents like EHV-9, BPV-1 and BPV-2 have the potential to spread from zebra to other wild endangered animal species. We conclude that zebra is an important host for multiple and dangerous pathogens. Alert and epidemiological research should be increased on infectious agents of zebra.

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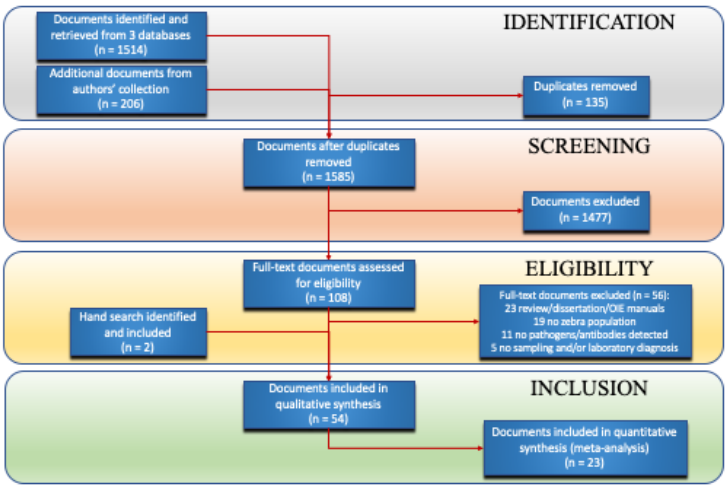

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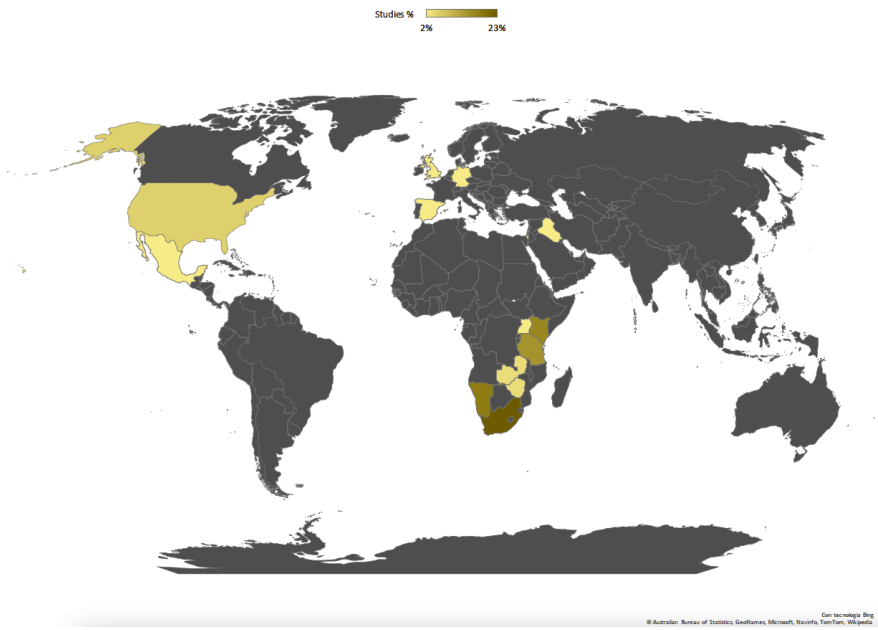

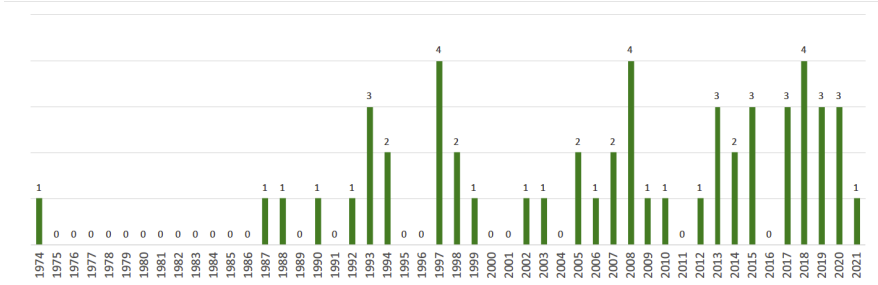

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VIRAL SPECIES
African Horse Sickness Virus (AHSV)
Akabane Virus (AKAV)
Asinine Herpesvirus 5 (AsHV-5)
Bovine Papillmavirus 1 (BPV-1)
Bovine Papillmavirus 2 (BPV-2)
Crimean-Congo Hemorrhagic Fever Virus (CCHFV)
Equine Arteritis Virus (EAV)
Equine Encephalosis Virus (EEV)
Equine Herpesvirus 1 (EHV-1)
Equine Herpesvirus 2 (EHV-2)
Equine Herpesvirus 4 (EHV-4)
Equine Herpesvirus 5 (EHV-5)
Equine Herpesvirus 7 (EHV-7)
Equine Herpesvirus 9 (EHV-9)
equid Hepatitis B Virus (eqHBV)
Wesselbron Virus (WSLV)
Wild Ass Herpesvirus (WAHV)

BACTERIAL SPECIES
Anaplasma spp.
Bacillus anthracis
Clostridium difficile
Escherichia coli
Spotted Fever Group (SFG) *Rickettsia spp.*
Staphylococcus aureus

PROTOZOAN SPECIES
Babesia caballi
Cryptosporidium spp.
Klossiella equi
Neospora caninum
Theileria equi
Trypanosoma spp.

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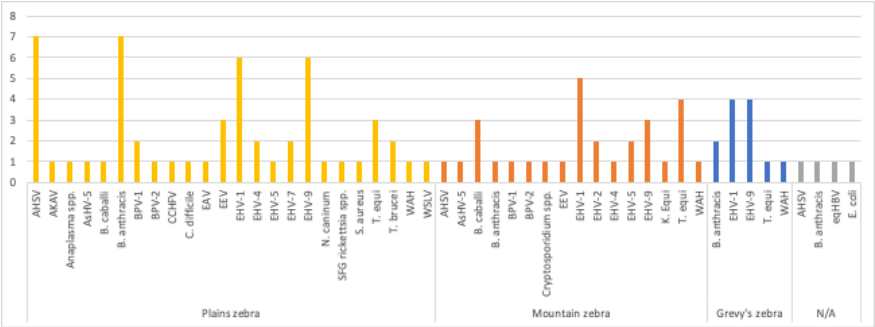

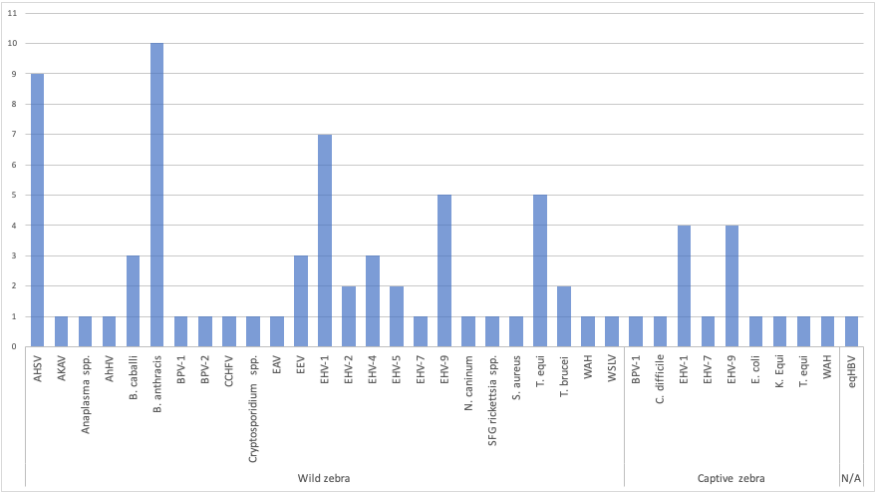

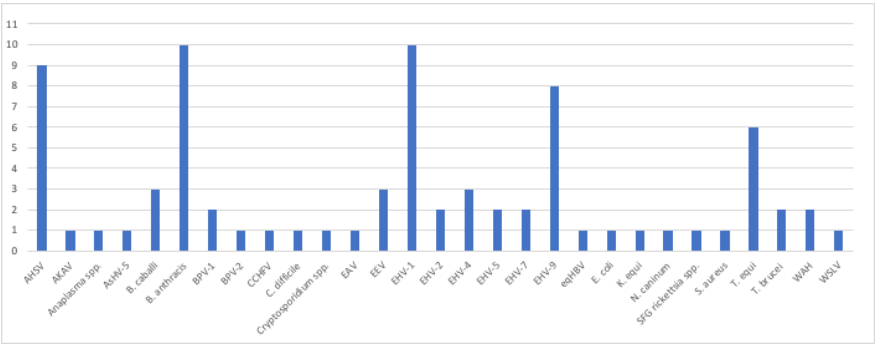

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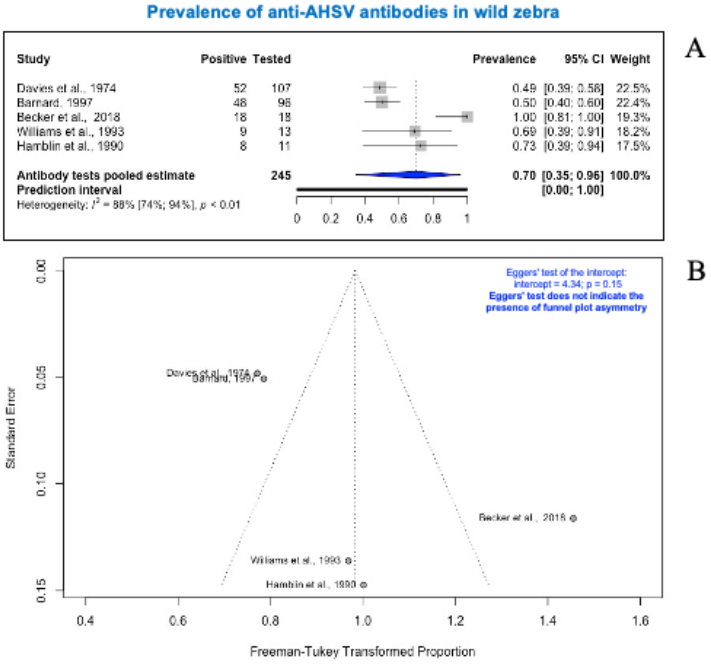

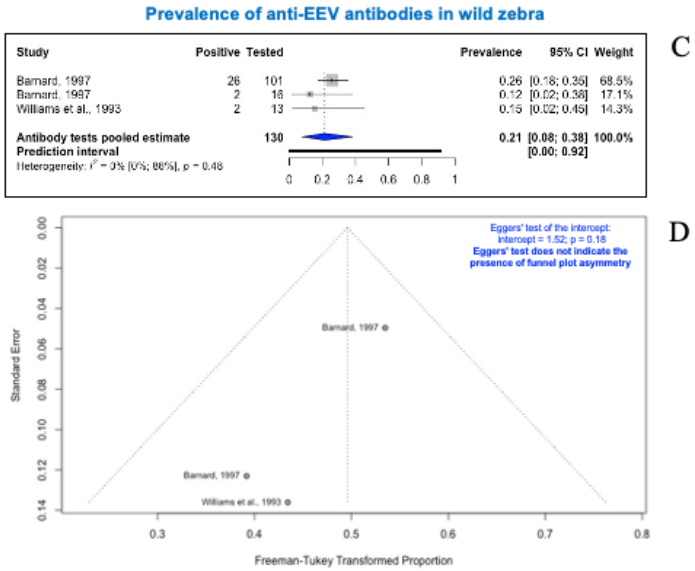

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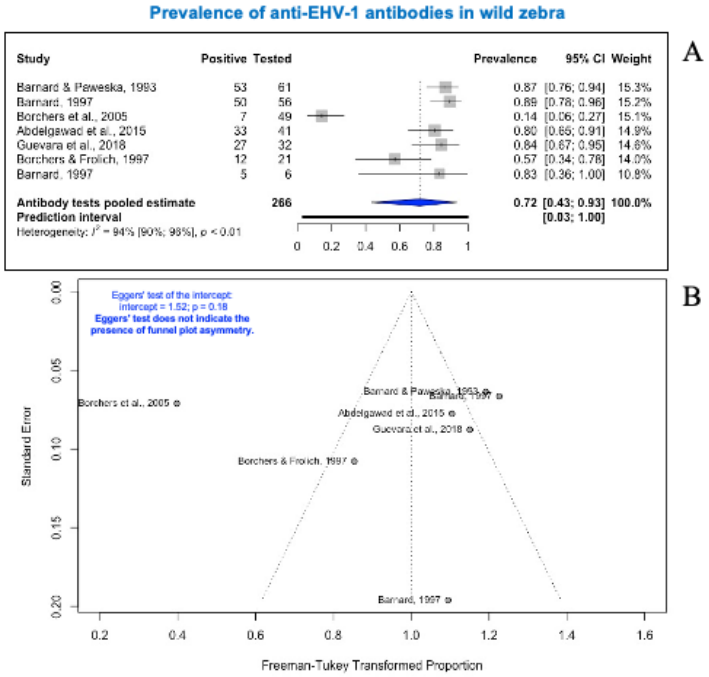

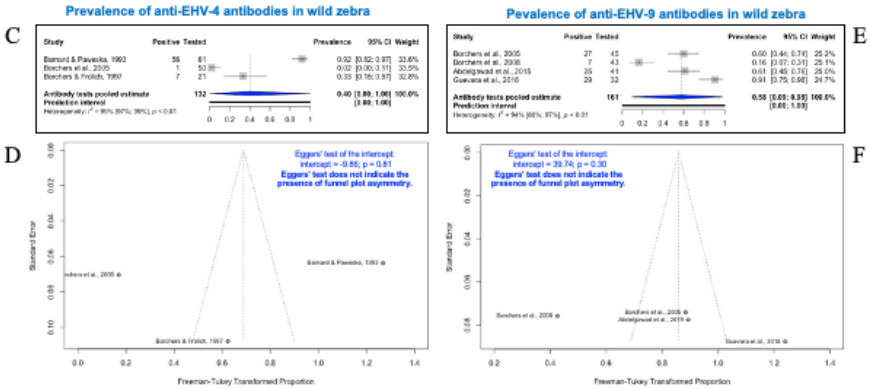

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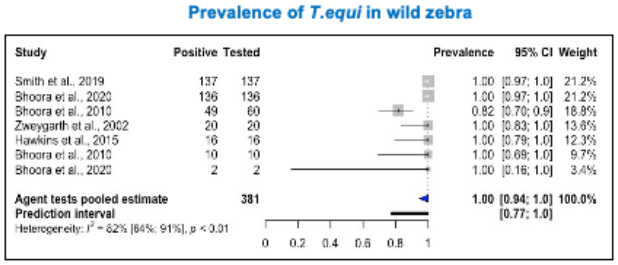

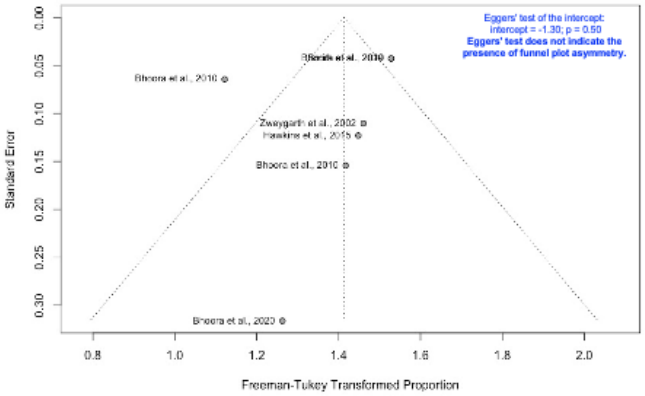

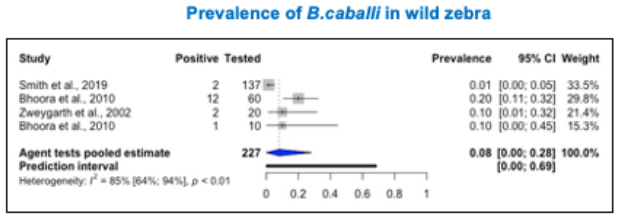

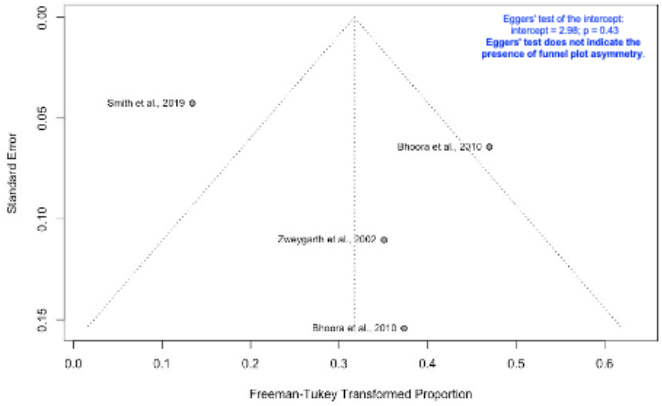

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