Orthoflavivirus Infection In Juvenile Horses

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Pathogenic orthoflaviviruses affecting horses in Australia include Kunjin strain of West Nile virus (WNV_{KUN}), Japanese encephalitis virus (JEV) and Murray Valley encephalitis virus (MVEV). This study investigates orthoflavivirus infection in juvenile horses.

Serum samples were collected each July from 2020 to 2023 from yearlings and two-year-old juvenile horses from our teaching herd. Pan-flavivirus, MVEV, JEV, and $WNV_{(KUN)}$ blocking Enzyme-Linked Immunosorbent Assay (bELISA) assays were performed, with percentage inhibition (PI) values calculated. Titre of the sample was further compared with virus neutralization tests to identify the primary infecting pathogen if bELISA PI >70%. Rainfall data for the corresponding years were sourced from the Bureau of Meteorology and analyzed.

Analysis of accumulative rainfall classified 2022 as a flood year, while all other years fell within normal variability. No seropositivity to JEV was detected in 2020 and 2021. In 2022, 16 out of 20 (80%) juvenile horses tested positive for JEV. A similar pattern of seropositivity was observed in the pan-flavivirus bELISA results. Additionally, MVEV seropositivity was observed in 7 out of 20 (35%) horses in 2022 and 3 out of 10 (30%) horses in 2023. Across the entire study period, all samples tested negative for $WNV_{(KUN)}$.

Kunjin strain of WNV is absent, but JEV began circulating in 2022 in Queensland. Extensive cross-reactivity was observed between JEV and MVEV using bELISA. The increased pan-flavivirus positivity in 2022 may be associated with the flood condition, the circulation of JEV, or a combination of both factors.