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TESTING A WEST NILE VIRUS VACCINE IN SANDHILL CRANES (GRUS CANADENSIS)

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Abstract: Eight sandhill cranes (Grus canadensis) were vaccinated with a commercial equine West Nile virus vaccine (Fort Dodge Animal Health, Fort Dodge, Iowa, USA) at the USGS Patuxent Wildlife Research Center, Laurel, Maryland, USA. Three doses of the vaccine were given, the first dose (day 0) was followed by a second 21 days later and the third dose 7 days after the second day 28 after the first dose). All doses were 0.50 ml. In addition, 5 sandhill cranes were given injections of similar amounts of sterile water on the same schedule. Blood for complete blood counts, serum chemistries, and serological testing was collected at weekly intervals. Ten weeks after the first injection of the vaccine and 6 weeks after the last of the 3 injections of the vaccine, the cranes were shipped to the USGS National Wildlife Heath Center, Madison, Wisconsin, USA. After a two-week adjustment period, 11 of these cranes were injected intramuscularly with one mosquito dose of West Nile virus. Two of the vaccinated cranes were not challenged and acted as uninfected controls. One week post challenge the only abnormal findings were slight weight loss (average 6% loss since the time of challenge with West Nile virus) and elevated white blood cell counts (heterophilic leukocytosis). There were no deaths and no clinically ill cranes (unvaccinated or vaccinated cranes) among the 11 challenged birds. All cranes were euthanized 6 weeks post challenge, and necropsies were performed. Pre-challenge titers showed no titer response to the vaccinations. However, when challenged, vaccinated cranes developed titers more quickly (within 7-10 days), and were viremic and shed virus via the cloaca for a shorter period of time than the unvaccinated cranes (2-7 days for vaccinated cranes versus 2-10 days for unvaccinated cranes). No remarkable lesions were noted in any of the cranes during the necropsy examinations. Histopathological findings are available for only four of the cranes at this time. Three of those had mild to moderate encephalitis, myelitis, and myocarditis. Initial histopathological findings also indicated a difference in the lesions found in the brains of the vaccinated versus unvaccinated cranes. The fourth crane was a vaccinated unchallenged control that had none of the lesions described. We concluded, based on the findings of no adverse reactions and the higher titers and reduced viremia seen in the cranes, that, indeed, the vaccine is safe for use in cranes and can be effective in reducing the severity of a natural infection. We would recommend this vaccine for use in adult cranes. A companion study is looking at the safety and efficacy of the vaccine for crane chicks as young as 7-10 days of age and that will be reported at a later date.

Key words: disease, Grus canadensis, sandhill crane, vaccination, virus, West Nile virus