

Scientific Comment on use of Selective Breeding and Release of Captive White-tailed Deer for CWD Prevention and Management

Chronic Wasting Disease Research Consortium[†]

Purpose: Chronic wasting disease (CWD) represents a preeminent threat to the health and sustainability of wild cervid populations in North America. Recently passed legislation in Oklahoma proposes a mechanism to release captive-bred deer into the wild that have specific prion protein genotypes. As deer managers and animal health authorities make decisions on management approaches, understanding the current state of science is important and the risks associated with the release of captive animals is important. The CWD Research Consortium[†] has prepared this document to provide science-based information for any entity that may engage with lawmakers and other interested parties on these topics.

Main points:

1. White-tailed deer are abundant and widespread throughout much of the US. **There is no feasible approach to releasing captive-bred white-tailed deer that would meaningfully change a free-ranging deer population's genetic structure**, neither locally nor at scales relevant to management, particularly in hunted populations.
2. **Efforts to prevent direct and indirect contact between captive and wild deer are important** to lower risk of pathogen transmission.
3. **Movement or release of live cervids is a significant risk factor for disease transmission, including the introduction of novel pathogens as well as CWD prion spread to new areas.** Human-assisted movement of any live deer, regardless of deer genotype, increases risk of introducing or moving CWD.
4. **All white-tailed deer are susceptible to CWD.** No alleles or combinations of alleles have been identified that prevent CWD infection, thus there are no known truly “resistant” genotypes.
5. Despite ongoing research in this area, **there are critical knowledge gaps and scientific uncertainties about the relationship between CWD and deer genetics.** Further research is needed to better identify and understand potential unintended consequences prior to the application of genetic tools to CWD management in free-ranging cervids.
 - a. **Certain alleles within the prion protein gene influence CWD progression by extending the incubation period.** More information collected from controlled studies would assist in efforts to scientifically assess the mechanism by which incubation period is altered and to better understand the influence of deer genetics on **prion shedding profiles (e.g., duration and extent) within the context of CWD transmission.**
 - b. Research suggests that the prion protein gene interacts with CWD prions in ways that could result in the adaptation and emergence of **new CWD prion strains.** New strains could have undesirable properties, such as increased efficiency of transmission among cervids, increased potential for interspecies (e.g., livestock, humans) transmission, or the potential to evade existing diagnostic tools.
 - c. Selectively breeding deer for specific alleles of the prion protein gene may come with costs, known as **fitness tradeoffs.** Deer that live longer with CWD may be less fit (have decreased capacity to survive and reproduce), but no research has been conducted to document fitness tradeoffs in this system.

[†] The CWD Research Consortium is a group of independent researchers currently working on CWD who aim to advance research priorities through collaborative efforts. The Consortium's membership spans disciplines and jurisdictions involving academia, state and federal agencies, Tribal Nations, and non-governmental organizations. <https://nimss.org/projects/18702> <https://www.cwd-research.com/>