



## What about viruses and wild bird populations?

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The rapid decline in populations of important West Texas avifauna, such as quail (an important staple to many native's view of outdoor life in Texas and sporting enthusiasts alike), has led to tackling hypotheses regarding: if disease is a limiting factor to these bird's wild numbers, and disease's role in population decline.

**New Findings** Quail-Tech has found a bird with high levels of antibody against West Nile virus (WNV) from among the many samplings being screened. The bird, a scaled quail (*Callipepla squamata*) also commonly referred to as a blue quail, is native to western and central Texas. The bird was found to have statistically significant elevated levels of antibody to the WNV antigen as compared to control, as well as other quail serums. Since antibodies are the targets of Quail-Tech's screening protocol, the high level of detectable antibody is indicative, not only of a possible current infection, but, and more notably, to past infection and/or viral exposure. The presence of antibodies to WNV in serum suggests that quail might show resistance to this virus or perhaps be another reservoir/host to the life cycle of the virus (Komar et. al., 2003). Hence, future steps to test this theory need to be accomplished, such as identifying present infection in quail and assessing any outward symptoms. Previous literature has hypothesized that WNV-infection in certain birds other than previously identified amplifying hosts (e.g., the crow and blue jay in which WNV is very lethal to individuals and to entire populations) might be carriers with no outwardly visible signs that infected individuals are susceptible to the infection, which, thereby would not be a factor in increases to mortality. However, a point of concern to many researchers is that WNV is a newly recognized stressor to these wild populations; meaning that the mere presence of WNV might be adversely affecting the bird's response to more common illnesses, changes in environment, food shortages, natural predators, etc.

**WNV** was first detected in the Western Hemisphere in 1999 and has since rapidly spread across North America. It is a part of the Japanese encephalitis complex of viruses that are found in tropical and temperate regions. Birds are mainly infected, but the virus may also infect humans, horses, dogs, cats, bats, chipmunks, skunks, rabbits, and squirrels. The most common route of transmission of WNV from animal to animal (human included) is the bite of an infected female mosquito. In this scenario, the mosquito is known as a vector of WNV. The virus is a zoonotic disease, meaning there is transmission between animals and humans. The importance of this virus to a quail population in decline, and what is of interest to Quail-Tech, is that just like any virus it is a stressor to a population already in distress due to factors such as loss of habitat, drought, and decline in fitness.

**Population** decline and individual susceptibility to WNV has been shown in the sage grouse (*Centrocercus urophasianus*). The sage grouse, endangered in Canada and under current consideration for federal listing in the U.S., is very susceptible to WNV and the potentially devastating population reduction that might bring. The studies that involve WNV and a native avian population in decline are pertinent to Quail-Tech's advancement in preventing such a dramatic and possibly irreversible decline, in native quail populations in Texas. Serum samples collected from the grouse after outbreaks have consistently shown no antibodies, suggesting that they lack resistance; resistance that Quail-Tech hypothesizes is present in quail because of the sample found to have a high level of antibody against WNV. Naugle et al. stated, "The spread of WNV represents a significant new stressor on sage-grouse and probably other "at-risk species." Quail-Tech hopes to conduct further research to determine to what extent quail are at-risk!

**The first time discovery** of antibodies specific to WNV in scaled quail is of extreme importance to biologists and hopefully will further research efforts to increase quail numbers. Quail-Tech is continuing to screen samples of native quail serum, including Bobwhites (*Colinus virginianus*), for antibodies to WNV, as well as against other viral and bacterial pathogens. Viral impact on wild birds will require ascertaining the proportion of each population that is infected/exposed, as well as estimating mortality rates in relation to viruses, both as an infectious disease and/or as a stressor.

**Potential implications and the impact on Texas wildlife** are that WNV might be well-established and might spread further to other areas (i.e. ranches) where quail species are stressed by factors such as habitat loss, drought, and/or food limitation and where year-round covey fitness, meaning overall health, is challenged. Threatened bird species might be at significant risk, where the increase in mortality to even just a few individuals could be significant.

**Future** research examining ecology and prevalence of the virus among reservoir hosts is vital. If quail are identified as reservoir hosts to WNV, the ability to take a huge leap forward toward the conservation of wild populations is possible, because of new directives and insights on virus and host relationships specific to quail. Directives include, but are not limited to, population genetics, epidemiology, and management. Moreover, Texas Tech is following-up to learn if WNV infection/exposure puts quail at a higher risk for other issues (man-made and natural) that may adversely affect their numbers in the wild. For information on other issues, visit [www.quail-tech.org](http://www.quail-tech.org)

#### Literature Cited

Komar, O. et al. 'West Nile virus transmission in resident birds, Dominican Republic,' *Emerg Infect Disease*, 9, 10: 1299-1302 (2003).

Naugle, D.E. et al. 'West Nile virus and sage-grouse: what more have we learned?' *Wildlife Society Bulletin*, 33, 2: 616-623 (2005).

Walker, B.L. et al. 'West Nile virus and greater sage-grouse: estimating infection rate in a wild bird population,' *Avian Dis*, 51, 3: 691-6 (2007).

## Q&A from the CDC – WNV and Wild Game/Meat

From CDC website [http://www.cdc.gov/ncidod/dvbid/westnile/qa/wnv\\_hunters.htm](http://www.cdc.gov/ncidod/dvbid/westnile/qa/wnv_hunters.htm)

### **Q. Is there a risk of getting infected with West Nile virus (WNV) if I eat turkey or another animal that has been infected with the virus?**

**A.** There is no evidence that people can become infected with WNV from eating infected meat. The small, theoretical risk of infection can be eliminated by proper handling and thorough cooking of meat before it is consumed.

Several well-known and potentially serious food-borne illnesses can occur when turkey and other meats are improperly handled or undercooked. For more information on food safety, please see: <http://www.cdc.gov/foodsafety/>

### **Q. What is known about the risk of West Nile virus infection from dried, uncooked meat (jerky)?**

**A.** There are no published studies that directly address this question. Most studies indicate that while mammals can become infected with West Nile virus, they do not develop high concentrations of virus in their blood or tissues. Although it is unlikely that dried meat from mammals would have much virus present, and probable that gastrointestinal digestion would further limit the possibility of infectiousness, there is insufficient evidence to determine whether dried meat presents a risk of West Nile virus infection to humans or other animals.

If you have questions about this topic it may be advisable to contact local wildlife authorities and/or health authorities to find out whether the area where the animal was harvested has West Nile virus activity, and whether animals of the species in question were affected.

### **Q. Are duck and other wild game hunters at risk for West Nile virus infection?**

**A.** Because of their outdoor exposure, game hunters may be at risk if they are bitten by mosquitoes in areas with West Nile virus activity. The extent to which West Nile virus may be present in wild game is unknown.

### **Q. What should wild game hunters do to protect against West Nile virus infection?**

**A.** Hunters should follow the usual precautions when handling wild animals. If they anticipate being exposed to mosquitoes, they should apply insect repellent to clothing and skin, according to label instructions, to prevent mosquito bites. Hunters should wear gloves when handling and cleaning animals to prevent blood exposure to bare hands and meat should be cooked thoroughly.

### **Q. Who should wild game hunters contact for information about the risk for West Nile virus infection in specific geographic areas?**

**A.** Hunters should check with their local area department of wildlife and naturalist resources, state epidemiologist at the state health department, or the US Geological Survey (USGS) National Wildlife Health Center, Madison, WI, 608-270-2400 for information on local area risk.