

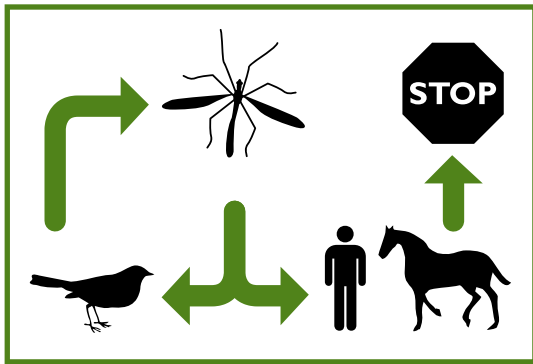


EQUIPLAS[®] WNV

AN OVERVIEW OF WEST NILE VIRUS

HISTORY

West Nile Virus is a vector-borne virus that was considered an Old World virus until it was first identified in the Western Hemisphere in 1999. West Nile Virus is an arbovirus spread primarily by infected mosquitoes. It is in a subgroup of the genus flaviviridae and is related to viruses of the Japanese Encephalitis complex. It was discovered as the cause of encephalitis and death in birds, humans and horses of the New York City area. Since its introduction to the Eastern United States, WNV has spread across the country with 22,602 laboratory-confirmed equine cases reported since 1999 involving 47 states.¹ More than 16,300 people have gotten ill and 634 have died in the United States.



Mammals are 'dead-end' hosts. The level of viremia is generally too low to transmit the infection back to the mosquitoes.

TRANSMISSION CYCLE

Invertebrate vectors, such as mosquitoes, circulate the virus among wild birds. Occasionally, the virus is introduced into other vertebrate populations, such as humans or horses, which serve as incidental hosts. Mosquitoes are the only vectors found to be associated with outbreaks of WNV in the US.

In the United States, WNV has caused disease and death in humans, wild birds, zoo birds, and horses. The virus is known to cycle between birds and mosquitoes. Wild birds are the reservoir for the virus, which is transmitted by mosquitoes. Although mammals may contract WNV through an infected mosquito bite, they are considered 'dead-end hosts' because the virus does not generally amplify in their blood to levels high enough to be infective.² Horses are affected by WNV much more often than any other domestic species. Although many horses infected with WNV do not develop any illness, 33% of those horses that do become ill die or require euthanasia.³

MOSQUITO FACTS

Mosquitoes are insects belonging to the order Diptera, the True Flies. There are over 2,500 different species of mosquitoes throughout the world; about 200 species

occurring in the United States.⁴ While over 30 species have tested positive for WNV transmission, the mosquito most closely associated with transmitting WNV in the Northeast U.S. is the *Culex pipiens* (Northern House Mosquito).⁵ *C. pipiens* breed in standing water, especially in water containing decaying organic matter, such as plant debris or animal waste. *Culex* mosquitoes are painful and persistent biters, and prefer to attack at dusk and after dark. They will readily enter a home or animal dwelling in search of a blood meal, but domestic and wild birds are preferred over man, cows and horses.⁴ In the Southern US, *Culex quinquefasciatus* (Southern House Mosquito) are suspected carriers of WNV but this species is more likely to bite humans.⁵

HUMAN PRECAUTIONS

When working with an animal showing signs of a CNS disorder with an undetermined cause, the USDA recommends that precautions be taken to avoid possible exposure to rabies virus. When visiting premises to investigate an unknown disease condition, measures should also be taken to prevent exposure to a variety of arthropod-borne zoonotic pathogens. To protect oneself from mosquitoes carrying WNV, application of commercially available insect repellents containing DEET to clothing and any exposed skin areas should be sufficient. Do not use DEET repellants on infants.

EQUINE SYMPTOMS OF WNV

The WNV interferes with the horse's normal CNS when the virus multiplies in the horse's blood system, crosses the blood brain barrier, and infects the brain. The virus causes encephalitis.⁶ Current data shows that many horses infected with WNV will recover. The clinical signs of a horse showing possible symptoms of WNV include:

- Spinal Ataxia and weakness
- Facial twitching and blinking
- Chewing, licking and hyperesthesia early in the disease
- Partial paralysis
- Loss of appetite
- Depression or lethargy
- Head pressing or tilt
- Impaired vision
- Wandering or circling
- Inability to swallow
- Inability to stand up
- Convulsions
- Coma
- Death.



Although some combinations of these symptoms have been seen in horses infected with WNV, it has been reported that many infected horses do not 'act sick'. Eating, drinking, urination, and defecation may appear normal and the horse may remain bright and alert. Some owners may postpone calling their vet despite noticeable ataxia because the horse had not gone 'off feed'.⁷ Once a horse is exposed to the virus, the incubation period is approximately 5–10 days.

There are several diseases affecting the CNS that share clinical signs of WNV. Differential diagnosis should include: alphaviruses, rabies, equine protozoal myeloencephalitis (EPM), Equine Herpes Virus-1 (EHV-1), botulism, and other serious neurological diseases. Non-infectious causes to consider include hypocalcemia, tremorigenic toxicities, hepatoencephalopathy, and leukoencephalomalacia.⁸

ANIMAL PRECAUTIONS

To protect horses from becoming infected with WNV the key is vaccination and mosquito management. Remove any sources of water that would be potential breeding sites for mosquitoes. Some possible suggestions may be:

- Dispose of any containers holding stagnant water, including discarded tires
- Clean clogged roof gutters as necessary
- Turn over plastic wading pools or wheelbarrows when not in use
- Do not allow water to stagnate in bird baths
- Aerate ornamental pools or stock with fish
- Clean and chlorinate swimming pools
- Use landscaping to eliminate standing water
- Clean livestock watering troughs monthly or use non-toxic larvicide, such as BTI.

It is also suggested to take steps to prevent the horse's exposure to adult mosquitoes in the area, such as:

- Treat horses with topical insect repellants. Note that fly repellent is not necessarily a mosquito repellent. Synthetic pyrethroids applied topically will be reasonably effective. Natural alternatives include sprays with citronella, lavender, and/or oil of eucalyptus or soybean oil
- Use fans to control the presence of mosquitoes in stables
- Stable horses at dawn and dusk, turning off lights in barn at night
- Install screens over doors and windows and practice good barn-keeping

- Avoid the use of bug zappers near horses, as this attracts mosquitoes and also kills off helpful insects, such as dragonflies and other mosquito predators
- A USDA licensed WNV vaccine became commercially available in 2001. In lab trials, the vaccine was 95% effective in preventing measurable viremia in horses.¹

TREATMENT

Anti-inflammatory medications, IV fluids and supportive therapies are the mainstay of treatment. Treatment should address the clinical signs present. Treatment options include Ribavirin, Interferon alpha, DMSO, and hyperimmune plasma. It has been found that many of the horses that are going to survive begin to recover rapidly regardless of treatment scheme.⁹ EQUIPLAS[®] WNV can be administered to provide immediate passive immunity as an aid in the control of the disease associated with West Nile Virus in adult equidae. The State of California, Department of Agriculture, Bureau of Animal Health has granted Plasvacc USA Inc. a license for **EQUIPLAS WNV**, West Nile Virus Antibody, Equine Origin.

REFERENCES

1. www.aphis.usda.gov/vs/naahps/equine/wnv
2. Environmental Risk Analysis Program (ERAP), Cornell University—Center for the Environment. "What's going on with the West Nile Virus: Summary & History" October 8, 2002.
3. USDA, September 2002. "Prevention and Control of West Nile Virus Infection in Equine and Other Livestock or Poultry."
4. The American Mosquito Control Association. www.mosquito.org
5. ERAP, Cornell University. "What's Going on With the West Nile Virus." October 10, 2002.
6. Center for Disease Control. www.cdc.gov. West Nile Virus: Questions & Answers. August 29, 2002.
7. Equine Clinician's Network. September 18, 2002.
8. Proceedings 20th ACVIM 151, Dallas, TX 2002. West Nile Virus—Clinical Presentation, Differentiation from Other Encephalitides, and Management.
9. Clinical Dialogue: Incidence of West Nile Virus in the United States. Supplement to Compendium on Continuing Education for the Practicing Veterinarian. 2003.

Plasvacc USA Inc.
1535 Templeton Road,
Templeton, CA 93465
Toll Free (800) 654-9743
Phone (805) 434-0321
Fax (805) 434-2720
Email usmail@plasvaccusa.com
Web www.plasvaccusa.com

Technical support and inquiries to Chief Scientific Officer

Dr Ross Wilson
Phone (805) 286-7744
Email rwilson@plasvaccusa.com

To order

Please contact Plasvacc.

PLASVACC
FOR LIFE[®]