

Selected Pathogens of Veterinary Importance Transmitted by Mosquitoes

Centers for Disease Control and Prevention Website

<http://www.cdc.gov/ncezid/>

Viruses

Eastern Equine Encephalitis (EEE)

- Atlantic and Gulf Coast regions of US
- Horses are primary hosts; few survive acute infections (2-5 days)
- Most pathogenic among encephalitic viruses
- Disease cycle primarily involves sparrows as reservoirs
- Vaccine is available

Venezuelan Equine Encephalitis (VEE)

- South and Central America, Mexico
- Occurs in birds, bats, horses, horse mortality 40%
- 1971 outbreak in Texas, last appearance in US
- Vaccine is available

Western Equine Encephalitis (WEE)

- 1995 last reported in Montana
- Horses are primary host
- Vaccine available
- Two cycles:
- Temp. Pool mosquitoes (*Culex tarsalis*) and birds
- Floodwater mosquitoes (*Aedes melanimon*, *Ae. dorsalis*) and jackrabbits

West Nile Virus (WNV)

- 2002 first detected in Montana
- Primarily a bird virus
- Humans, horses are incidental hosts
- Equine vaccine available

Rift Valley Fever Virus (RVFV)

- East and West Africa, Egypt, Saudi Arabia, Yemen (2000)
- Infects cattle, goat, sheep, buffalo, deer
- Devastating to humans, livestock; livestock and deer are reservoirs
- 100% abortion, high mortality in young animals
- Would likely spread as rapidly as WNV but with far more serious consequences
- Vaccine available

Cache Valley Virus (CVV)

- Reported in lambs in northern Great Plains in 2011
- Virus infects fetus of bred females (mainly sheep and cattle)
- Deer are possible reservoirs for CVV
- Several mosquito species (*Aedes*, *Culiseta*, *Culex*) are proven vectors

Protozoan

Malaria

Reptile malaria infects a wide range of lizards and snakes.

- Not exclusively vectored by mosquitoes; some parasites transmitted by sand flies and biting midges.

Avian malaria is primarily found in Africa, Asia, South America, Hawaii, Calif.

Mosquitoes, biting midges, louse flies and black flies are vectors.

- Avian malaria (*Plasmodium*) has reduced native bird populations in Hawaii.
- *Haemoproteus* spp. (malaria parasite) infects a wide range of birds.
- Poultry industries (chicken, duck, turkey) greatly affected 90% mortality.
- Screening on poultry houses prevents transmission

Rodent malaria is common in Africa and Asia and infects rodents like porcupines and squirrels. Impact is unknown.

Primate malaria affects monkeys, gibbons, orangutans.

- Twenty-five species of *Plasmodium* infect nonhuman primates. Most, if not all, are transmitted by *Anopheles* mosquitoes – same vector for human malaria.

Nematodes

Canine heartworm

- Filarial nematode, *Dirofilaria immitis*, transmitted by several species of mosquitoes.
- Development of nematode in mosquito is temperature dependent
- Microfilariae circulate in peripheral blood at night (nocturnal periodicity).
- Adult worms occupy right ventricle of the heart and the pulmonary arteries.
- Ivermectin treatments are available.