

## Protecting Florida Horses From Mosquitoes<sup>1</sup>

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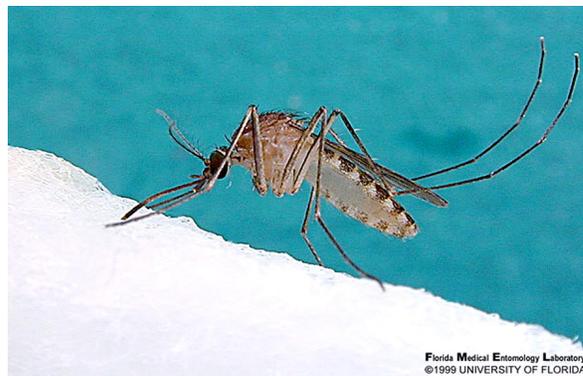
### Introduction

Fly control for horses in Florida is crucial, both for the irritation they cause and as protection against disease. The most common equine mosquito-transmitted disease currently in Florida is Eastern Equine Encephalitis. The discovery of West Nile virus in north Florida in July 2001 increases concern about mosquito-transmitted equine disease and the need for mosquito control. The possibility of other exotic viruses entering Florida, such as Venezuelan Equine Encephalitis, is also of concern to horse owners. One method of disease prevention in horses is protection from mosquito bites.

There are many types of flies other than mosquitoes that affect horses. Most of the repellents and insecticides used against mosquitoes are also effective against other flies. However, other control methods are specific to groups of flies. Here, we will address only mosquitoes (Fig. 1)

### Basic Mosquito Biology

All mosquitoes require standing water or moist soil to breed, but the type of water they prefer depends on the species. Some prefer containers, such



**Figure 1.** Adult female mosquito, *Culex nigripalpus*.  
Credits: James Newman

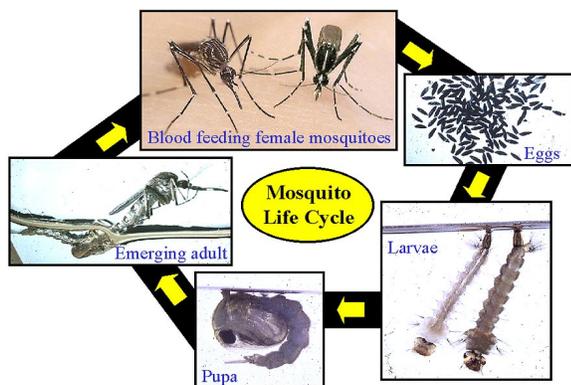
as tires, tree holes, buckets, and water troughs. Others prefer water with lots of organic material (leaves, grass) that is very stagnant. Still others breed primarily in swamps and marshes, some fresh water, and some salt water. Which species are most important in disease transmission depends on the location, virus, and other animals (amplification hosts) involved. Control of these different types of mosquitoes obviously requires different approaches. Some can be affected by measures taken at individual stables, such as reducing or cleaning water holding containers. Other species require more extensive management, such as impoundments, truck or aerial

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sprays, and treatment of ditches or other large bodies of water.

After the aquatic stages, the adult mosquito emerges (Fig. 2).



**Figure 2.** Life cycle of a mosquito: eggs, larvae, pupa, and adult. Credits: James Newman and George O'Meara

Female mosquitoes bite animals, using the blood as a protein source to develop eggs. The eggs are laid in or near water, hatch (some require flooding, others hatch immediately), and begin larval development. Development from egg to adult can be completed in as little as 6-7 days in the summer.

Some species will bite almost any type of animal, while others are very specific. Different species vary in their preferred time to feed, but many feed during dawn or dusk. Mosquitoes tend to bite anywhere on the horse, unlike some other flies which concentrate on the midline, face or legs.

## Mosquito Protection for Horses

Mosquito protection for horses falls into several broad categories: reducing the population of mosquitoes; stabling, premise sprays and traps; physical barriers (horse clothing); and topical insecticides or repellents.

### Population Reduction

Mosquitoes which breed in temporary pools, ditches, swamps, and other bodies of water are difficult to control at an individual stable, and are generally best controlled by organized mosquito control programs. Mosquitoes that prefer to breed in small, temporary pools of water and containers, however, can be reduced around the stable. They are

quick to find and use any water-holding location, including puddles, tires, buckets, water troughs, and trash such as old soda cans. The best method for control of these mosquitoes is to reduce the number of places they can use to breed by controlling aquatic habitats in and around the stable.

- Keep water-holding containers to a minimum.
- Dump out, put away, or drill drainage holes in anything that can hold water which isn't needed for horse-keeping (including potted plants).
- Water buckets and troughs should be dumped, cleaned and refilled regularly - at least every 3 days.
- Watch for puddles which persist for several days: drain, fill or treat with formulations of Bti (*Bacillus thuringiensis var. israeliensis*). Only use products labeled for use in water and follow all label directions. Do not treat water sources used for drinking by animals.
- Contact your local mosquito control district and follow their recommendations.

### Stabling, Premise Sprays and Traps

Recommendations are often made to stable horses in insect-proof stables. However, these are difficult to achieve under any circumstances and, unless they are air-conditioned, not practical for Florida. Air circulation is needed to mitigate the high heat and humidity. Fine screening will reduce mosquitoes entering the stable, but will also reduce air circulation. Bug zappers typically kill many other types of insects and relatively few mosquitoes. Reducing contact between horses and mosquitoes is the most effective way to reduce bites.

- Stable horses during the dusk and dawn peak biting periods.
- Consider premise sprays and automatic spray systems. Automatic spray systems range from small, portable or wall mounted battery-operated systems which cover a few stalls to extensive tank-based whole-barn systems. Many use pyrethroid (see below) based sprays.

- New trap systems are available and may be effective, but are currently being evaluated.

### **Physical Barriers - Horse Clothing**

Physically preventing the mosquito from contacting the horse will reduce mosquito bites. There is a trade-off between mosquito protection and heat in the summer. Monitor horses wearing fly sheets and remove the sheet if the horse becomes too hot. Use caution when turning unsupervised horses out wearing this type of equipment, as they can become caught or tangled. Some types of horse clothing are listed below. These can be sprayed with repellents for additional effects.

- Fly sheets
- Face masks and ear nets
- Leg wraps

### **Topical Insecticides and Repellents**

The best known and most often used protection from mosquitoes is fly spray. There are many types on the market, with a wide variety of ingredients (Fig. 3)



**Figure 3.** Variety of topical insecticides and repellents on the market. Credits: James Newman

Which will work best depends on the horse, use, location, and type of mosquito causing the problem. Rotation between different types may help prevent resistance and maintain effectiveness. Make sure that if you rotate types, they each contain different active

ingredients, and are not just produced by different manufacturers.

The “natural” versus “chemical” debate is misleading in some ways. Whether derived from a plant or synthesized in a vat, all repellents and insecticides depend on a chemical which interacts with the mosquito to repel or kill it. Be aware that products which are registered as pesticides with the EPA **must** follow legal guidelines in their labels. These label instructions are the result of testing and review for safety and efficacy. It is illegal to recommend or apply these compounds in a manner inconsistent with the label. Products which do not come under EPA rules are not required to follow these guidelines; the label is for information only. This includes some, but not all, botanical or herbal repellents.

Common fly spray ingredients:

- Pyrethrins, extracted from chrysanthemum plants. Very effective but often of short duration.
- Pyrethroids, synthetically developed compounds chemically very similar to pyrethrins. These are effective and have very low toxicity to mammals, and often longer-lasting than pyrethrins.
- Permethrin and cypermethrin, two of the more common pyrethroids.
- Piperonyl butoxide, a common synergist, to enhance effectiveness and persistence of the chemical.
- Other plant extracts used in fly sprays include citronella, eucalyptus, pennyroyal, cedar, and geraniol.
- DEET, the ingredient in many repellents for human use, has recently been approved for use on horses but is available only from licensed veterinarians. Because it is a repellent only, and has no insecticidal effect, it will have less impact on the overall mosquito population. This may be the best choice for a horse that is sensitive to pyrethroids.

- Sunscreens, primarily to protect the chemicals from degradation in the sun.
- Oil or water based carriers.
- Fragrances and coat enhancers

Eastern Equine Encephalitis - Humans & horses:  
<http://edis.ifas.ufl.edu/MG101>

Which combination will work the best? It depends on the horse and activity. A stabled show horse will require a different approach than a pastured trail horse. Frequently groomed horses may be best protected with a shorter-acting, frequently applied spray while pastured horses may need a longer-acting treatment resistant to rain. Read the labels and rely on trial and error observations! Test products on a small area first; some horses are sensitive to different chemicals (including those in plant extracts).

Some options include:

- Ready to use sprays - good for frequent use.
- Concentrates, diluted before use. Often convenient to modify the dilution according to the current situation.
- Some sprays and concentrates can be used on premises as well as directly on horses.
- Lotions and gels - useful on legs and wounds.
- Spot on gels and lotions - longer acting, applied to specific sites on the horse and allowed to migrate through the hair coat. May be effective and convenient for pastured horses.

### **Additional Information**

For current information on West Nile virus and Eastern Equine Encephalitis virus activity in Florida, visit the Florida Medical Entomology Lab's Encephalitis Information System at <http://eis.ifas.ufl.edu>.

Additional information on WN and EEE can be found in other UF-IFAS Fact sheets:

West Nile virus - humans:  
<http://edis.ifas.ufl.edu/IN117>

West Nile virus - horses :  
<http://edis.ifas.ufl.edu/IN170>