

Learn to Live With and Respect Horse Flies and Deer Flies

By Steve Murphree



The American Horse Fly.
*Photo by Sturgis McKeever, Georgia Southern
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Due to their size, striking features and bloodthirsty habits, horse flies and deer flies seldom go unnoticed.

Anyone who has experienced a horse fly bite will not soon forget it. The smaller deer flies, however, are more often heard than seen. Most hikers in Tennessee State Parks and natural areas will recall being annoyed by incessant buzzing about their heads on humid summer days. When an aerial insect net is swept through the air above the head two to three times the culprits are caught.....deer flies that sometimes follow with a painful bite on the back of the neck.

Deer flies can be distinguished from horse flies by their smaller size (less than 10 mm in length) and the fact that most species have distinctively patterned wings. There are about 3,800 species of horse flies and deer flies worldwide with 350 species known from North America and 109 species reported from Tennessee. These agile fliers are also known as tabanids. They are true flies in the order Diptera (two instead of four wings) and belong to the family Tabanidae (Tabanus is Latin for gadfly).

Both adult male and female horse flies feed on nectar at flowers but only the females feed on the blood of mammals and other vertebrates. Some species even feed on aphid honeydew. The female's blood meals are needed to provide proteins for producing egg masses, a trend seen in other biting fly species like mosquitoes and no-see-ums. There are four life cycle stages: egg, larva, pupa and adult. Egg masses are laid on vegetation in marshes and at the edges of ponds and streams. All tabanids overwinter as larvae. The larger horse fly species may spend two or three years in the larval stage.

To Kill a Tabanid...

With few exceptions, tabanids can be said to "work the day shift." This includes the blood-letting work of females as well as mating which takes place on the wing and usually early in the morning. Tabanids prefer bushy areas, woods and forests that are damp or swampy. The females feed in bright sunlight using dark, moving objects as their targets. In fact, tabanid collectors erect and stake elaborate malaise traps, e.g., along old logging roads, which often have a beach ball hanging below them that has been painted shiny black. Granted, this sounds like a physicist's view of the biological world. To tabanids, though, the moving black balls look like deer moving in the woods and the balls really do increase the number of tabanids caught in these traps.

In addition, CO₂ in the form of dry ice and octenol, a volatile attractant that is essentially "essence of deer breath," are sometimes used at malaise traps to increase the number of tabanids attracted. Homeowners or campers with a horse fly or deer fly problem can simply inflate a beach ball painted shiny black, hang it from a tree limb at eye level and spray it with adhesive.

For effective control in a large area, however, several balls are required. Interestingly, adhesive-coated patches attached to a hiker's cap have been found to be effective at reducing the numbers of deer flies. Dr. James Cilek, an entomologist at Florida A & M University in Tallahassee, found that TredNot® patches removed 26 percent of the deer flies along trails. Both white and black caps with patches were tested and, while more deer flies were observed "buzzing" individuals with black caps, they caught the same number of flies.

For personal protection against tabanids, long sleeved shirts and pants in combination with a repellent containing

diethyltoluamide (DEET) are effective. A DEET concentration of 15 percent is sufficient, 10 percent is recommended for children aged two through six years and this repellent should not be used on children two years and younger.

There is one wasp species in the U.S. that serves as a type of biological control of horse flies and deer flies. Like its relatives, the mud daubers, the Horse Guard Wasp, *Stictia carolina*, is adept at catching tabanids on the wing, paralyzing them with their sting, and stuffing them in their underground burrow to provide food for their next generation.

A Game of Pool...

The majority of tabanids seen in the wild are the blood-sucking females. Males are rarely seen and can be distinguished from the females because their compound eyes touch each other whereas those of females are visibly separated.

Most horse fly males defend a territory by hovering and vigorously chase away any interloping males. When females fly by, the males pursue them. A study found that males of one species chased plastic beads shot past them at 30 meters per second! Horse flies and deer flies avoid buildings but one or more buzzing horse flies inside their windshield often surprise people who leave their automobile windows open in natural areas.

The painful bite of female tabanids is due to mouthparts (a pair each of blade-like mandibles and maxillary laciniae) that work essentially as miniature knives to slash open the skin and its capillary beds. These females, like black fly females known to plague trout fisherman in the northern U.S., are pool feeders that lick up the pool of blood that forms after their mouthpart lacerate your skin. Medical entomologists refer to this method of feeding as "telmophagy." Tennesseans can be thankful that the two most bloodthirsty horse fly species do not occur here.

Greenheads (*Tabanus nigrovittatus*) occur in salt marshes along the Atlantic coast, and the yellow flies (*Diachlorus ferrugatus*) of the Florida panhandle are both persistent and painful biters. Tabanids are known to transmit a bacterial disease called tularemia in North America and loiasis, a disease caused by the African eyeworm, *Loa loa*. Tularemia, also called "deer fly fever" is transmitted from wild animals to humans by tabanids in the western U.S. though ticks are more likely to transmit it in Tennessee. The bacteria cause an ulcerated lesion around the bite site and antibiotic treatment is required. Loiasis, transmitted by deer flies to humans in Africa's equatorial rainforests, is so named since adult worms sometimes migrate just beneath the conjunctiva of the eye, an alarming reflection in a mirror to be sure!

A Horse Fly of a Different Color...

Horse fly and deer fly females sometimes use the carbon dioxide we exhale to locate us as mosquitoes do, but mostly they find us with their enormous eyes. With the exception of dragonflies, tabanids have the largest "bug eyes" of the insects.

Most insects have compound eyes containing many adjacent units each with a surface lens. This makes the large eyes of tabanids resemble the surface of a geodesic dome like Epcot Center in Disney World.

The eyes of many species, when alive, are brilliantly colored with shades of green, yellow, orange and violet. Some species were named for their eye color like the greenheads that are vicious biters of humans in salt marshes along the Atlantic coast. Other species are named for their body color, e.g., the pestiferous yellow flies of the Florida panhandle. The "blue-tail fly" of American folklore was probably *Tabanus atratus*, a large black species whose abdomen has a blue cast. I grew up catching this species from the backs of hogs on a farm in Middle Tennessee.

While hosting the "Biting Fly Workshop" in Hickman County in 1996 with other tabanid enthusiasts, I was amazed to see an individual of a rarely collected nocturnal horse fly species, *Leucotabanus annulatus*, land on a sheet near a UV light. It was one of those moments when collectors stop what they are doing to gaze at a single insect and whisper in wonder before being brought back to reality when someone says, "catch it, before it flies away!" The species turned out to be a new record for Hickman County.

Tabanids probably fed on the blood of dinosaurs. Determined and desperate efforts rarely reduce their numbers. If we are to enjoy the wonders of the great outdoors during the hot weather of summer and early fall we will have to learn to live with and respect them.

You can read more about this topic in the 1985 publication *The Tabanidae of Tennessee* by J.T. Goodwin, B.A. Mullens and R.R. Gerhardt, published by The University of Tennessee Agricultural Experiment Station as Bulletin 642.

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