

Biting Midges of Coastal Florida ¹

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Coastal area residents and visitors to Florida are often aware that something is biting, but when they look for the offender, none can be found. Sometimes they may see what appears as a speck on the skin. Florida, unfortunately, is home not only for abundant mosquitoes, but also for minute biting insects known locally as "sandflies" (elsewhere as "no-see-ums" or "punkies"), although the more correct name is "biting midges." They are especially troublesome in coastal areas, where most of Florida's population lives. Biting midges are particularly abundant in the vicinity of mangrove swamps or salt marshes.

What Are Biting Midges?

These insects are all extremely small, less than 1/8" long. They belong to the insect order Diptera (two-winged flies), family Ceratopogonidae, genus *Culicoides*. Florida has 47 species in this genus, but only seven are significant human pests. The four most important, in order of their pest status, are *Culicoides furens*, *C. mississippiensis*, *C. hollensis* and *C. barbosai*; these are coastal in distribution. Several species are associated with dairy cattle and farming operations.

Appearance, Life Cycle, and Breeding Sites

Adult biting midges are gray in color with distinct wing patterns. When biting, or at rest, the wings are folded, scissor-like over the abdomen. The eyes on each side of the head are black and the biting mouthparts protrude forwards and downwards. Eggs are minute, cigar, or sausage shaped and black in color. The eggs of *C. furens* take about 3 days to hatch at 80 °F. Those of *C. barbosai*, *C. mississippiensis*, and *C. hollensis*, take 5 days to hatch at 80°F.

Some species occur primarily in wet mud in and around mangrove swamps and salt-marshes. Some larvae occur in the wet, but not submerged, mud around dairys, farms, swine and sheep operations. The eggs, which cannot survive drying, are laid on wet mud in the breeding places, that is, the habitats where the juvenile stages (larvae) are found. The larvae develop through 4 stages (instars) and are creamy-white in color and eel-like. They are predaceous, feeding on other small organisms. Full grown larvae are 1/8 to 1/4" long. The total time spent in the larval stage depends on temperature and the

1. This document is ENY-629, one of a series of the Entomology and Nematology Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Publication date: September 1997. Revised: May 2002 and May 2005. Reviewed: May 2008. Please visit the EDIS Website at <http://edis.ifas.ufl.edu>.

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season. When mature, the larvae change to pupae and remain in this stage for about 2-3 days.

Biting Habits

Only the female midge bites and takes blood. When biting, the midge uses small cutting teeth on the elongated mandibles in its proboscis to make a small cut in the skin. At the same time, a chemical in the saliva is injected to prevent blood clotting. Capillaries severed by the cut bleed and form a tiny pool of blood, which is then sucked up. Feeding takes approximately 2-5 minutes. The greatest biting activity in both species is around dawn and dusk. Some biting may continue through the night, but rarely during the day, unless the sky is heavily overcast and the winds are calm.

Reproduction

Female midges take blood to provide a source of protein for egg production. However, female *C. furens* and *C. mississippiensis* may also be autogenous, which means that some individuals are able to develop eggs immediately after they emerge from the pupal stage, without first taking blood. When blood has been taken, it is digested and the protein extracted to form eggs in the female midge's two ovaries. The number of eggs produced depends on the size of the female and how much blood she takes. *Culicoides furens* females will produce between 50 and 110 eggs per bloodmeal and *C. mississippiensis* from 25 to 50.

Seasonal Abundance

Culicoides furens is primarily a warm weather species that begins to appear in large numbers as soon as the spring warming trend begins. Biting females are abundant throughout the summer, with numbers decreasing as temperatures drop during the fall and winter months. Depending on local conditions, *C. furens* may continue to be a pest in south Florida even during the winter. *Culicoides mississippiensis* has two major population peaks, one from February through April, the other from late September through December. Populations of this species are lowest during the summer.

Human Disease Transmission

Both *C. furens* and *C. barbosai*, especially the former, are vectors of *Mansonella ozzardi*, a human nematode parasite. This worm, which rarely produces symptoms of disease in infected persons, is native to South America and is found also in several islands in the West Indies. The worms live primarily in the blood, but its juvenile forms (microfilariae) are found also in the skin. Female midges ingest the microfilariae when they take blood and then transmit the parasite to uninfected persons.

Control And Personal Protection

Control of adult biting midges with insecticide sprays is mediocre at best and temporary in nature due to the continual emergence of these flies. The larval habitats are so extensive that control of the larvae is not possible. Mosquito control districts in Florida are not funded to provide control of biting midges.

On the east coast of Florida, large areas of swamp in several counties have been impounded (surrounded by dikes and kept flooded with water), an environmental method, that involves changing the breeding habitat of the midges. Females no longer lay their eggs and larvae no longer develop in the flooded mud. Impounding is an effective control method both for salt-marsh mosquitoes and biting midges.

Recommendations for Bite Prevention

- Avoid outdoor activity during peak biting times.
- If outdoor activity can not be avoided during biting times, apply repellents labeled for biting midges **according to the label**.
- Increase air movement in screened porches by using high velocity fans.
- Screens can be treated with barrier sprays or portable foggers **according to the label** for temporary reductions in small backyard situations.
- Refer to the fact sheet on "Mosquito Repellents" at <http://edis.ifas.ufl.edu/IN419> for details on repellents that may work on biting midges