Three Times a Lady

Rob Gough

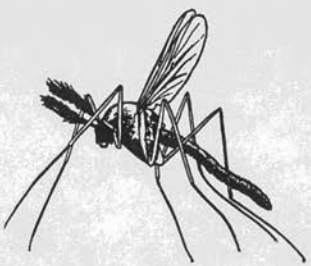
In communities near a salt marsh, seasons are not the same as they are in the rest of the world. In fact, in Essex County we even have our own names for these seasons. In May, Gnat Season begins. It is followed very shortly by Greenhead and Mosquito Season, after which, in late August, Gnat Season Part II begins.

Anyone who has visited the marsh between May and late August has undoubtedly met gnats, mosquitoes, and greenhead flies. On a windless day these three small creatures, alone or in concert, can make a walk near the wetlands a trying experience to say the least. All three belong to the order of insects called *Diptera*, which means "two-wings." Worldwide there are approximately 75,000 species of flies. In midsummer, I would swear that they all live in the marshes of northern Essex County, and they're on their way to my backyard.

Perhaps the most notorious of the three is the mosquito. In Essex County, many people feed birds, but *everybody* feeds mosquitoes. However, not all mosquitoes feed on blood. Of those mosquitoes that do feed on blood, not all bite humans (yes, even you!). Some feed only on birds; others take blood only from reptiles.

The saltmarsh mosquito, *Aedes solicitans*, is the bloodsucker that torments visitors to the marsh. In the spring, larvae hatch from eggs that have lain dormant all winter. The tiny larvae live in salt-marsh ponds. Their rear ends are equipped with tiny air tubes that they use to breathe air from the surface of the water. At this stage, the larvae are called wrigglers because of the way that they move about. The larvae feed on plankton and suspended organic matter. About a week after hatching, the larvae undergo the change to pupae. In butterflies, the cocoon is the pupal stage. In mosquitoes the pupae are very active and are called tumblers. This stage is brief and terminates when the exoskeleton ruptures and the adult emerges.

Newly emerged mosquitoes have enough energy reserves to get them through the first days of adulthood. Then they must seek their first meal. Surprisingly, it is usually nectar. The needle-like proboscis is well adapted for sucking the sugary liquid from flowers. Only female mosquitoes feed on blood. Female saltmarsh mosquitoes aren't picky. They suck blood from birds and mammals, including the mammals that get dressed from your closet. Blood provides protein that is needed for egg development. When her eggs are ready to be laid, the female mates. Males (and human hands) are attracted to females by the pitch of their buzzing. Fertilized eggs are laid on wet mud in marsh pannes. When the pannes are flooded, the eggs hatch, and a new generation of mosquitoes is born.



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Greenhead flies and gnats live different lives. These insects spend their larval stages squirming about in the marsh mud and sod in search of food. Greenhead larvae prey on other insects, insect larvae, and other small invertebrates. They overwinter in the sod, and in late June the first adults emerge. Like mosquitoes, only females take blood meals. However, their larval diet provides them with an initial store of protein with which they can lay their first batch of 100 to 200 eggs without needing blood. Thereafter, the female must take a blood meal from humans or other mammals. The females live for three to four weeks, repeatedly biting victims and laying eggs. Gnat larvae also spend the winter in the marsh sod. They emerge as adults in late May, and like the others, females seek out a blood meal.

While each of these insects feeds on blood, they differ in the way they get the stuff. (Warning: This gets ugly!) Mosquitoes have mouthparts fashioned into tiny hypodermic needles. They alight on a victim and insert their proboscis into the skin and pump blood into their stomachs. Greenheads have two separate mouthparts. One is like a small blade for slashing or sawing open the skin. As the blood begins to flow, a spongelike mouthpart soaks up the blood. Gnats have tiny, toothed mandibles that are used to gnaw into the skin. The blood is then lapped up. All three of these insects use an anticoagulant to prevent the blood from clotting. The welt that accompanies a bite is due to our body's reaction to the tiny amount of insect saliva that enters the wound during the bite.

The marsh would be great place without these insects. Or would it? All three are important links in the marsh food web. The larvae and adults of greenheads and gnats are at the top of the menu of many species of resident and migratory birds. Mosquito larvae and pupae are food for a host of small fish, which in turn are eaten by bigger fish. In addition to humans' role as unwitting blood donors in this food web, we appear again as top-level carnivores. So, next time you take a walk near the marsh, use insect repellent if you must. I, for one, don't mind donating a little blood to pay for the striped bass and flounder I plan to eat this summer. Now, I did say a *little* though.

Rob Gough *works as a freelance illustrator and graphic designer in Newbury, Massachusetts. His drawing of a Piping Plover (*Charadrius melodus*) appeared on the cover of the June 2000 issue of* Bird Observer. *Rob also works full-time for the Massachusetts Audubon Society as the Education Program Coordinator for the Joppa Flats Education Center in Newburyport. He leads natural history field trips along Massachusetts' North Shore, as well as out-of-state and international trips.* Three Times a Lady *was first published as part of the series, Nature In Our Backyard, in the* Daily News, *Newburyport, Massachusetts, July 7, 2000.*