

BLACK FLIES AND MOSQUITOES...

What Good Are They?



BY KAREN FINOGLE

Karen Finogle is a freelance writer from Newmarket, NH who still swats at black flies, despite her newfound appreciation of them.

A female Aedes mosquito.

Photo by Dennis Kunkel Microscopy, Inc., www.pbrc.hawaii.edu/~kunkel

They bother us through some of the best times of the year. Then they finally go away. But these nasty bugs really have some value to the ecosystem.

SWAT. SLAP. THWAT.

Ah yes, it must be springtime in New Hampshire. Never mind the singing birds and the blooming flowers, spring arrives here on the wings and whine of bloodthirsty black flies and mosquitoes.

Amidst the budding beauty around us, it's a season of war. We tuck our pant legs in our socks and arm ourselves with citronella, bug spray, and anything else that someone once told us "works pretty good." It's us or them — the blood-filled versus the bloodthirsty. And, in the end, battle worn and scarred, we generally lose, reclaiming our territory only after the enemy has left.

But what do we really know about our enemies? Did you know, for instance, that their ancestors date back 150-200 million years ago? If we're talking seniority, they've got us beat by a mile.

Have you considered that maybe they really aren't our enemies? Though they obviously feed on us, mosquitoes and black flies are also food for all sorts of creatures, including fish, birds and other insects.

And consider this the next time you're about to smack a mosquito on your arm. There are more than 2,500 species of mosquitoes throughout the world, 43 of which are known to occur in New Hampshire. Of those 43, only 28 species are known to feed on humans, and just 14 of the 28 species are considered to be serious pests due to their abundance. That doesn't sound so bad, does it?

Likewise, about 2,000 black fly species occur throughout the world, but only 40 species are known to exist in the Granite State. Of those 40, only two species are considered significant human biters, and two other species are considered annoying but don't generally bite.

Not ready to sign a peace treaty quite yet? A look at their life cycles shows some of their ecological benefits.

BLACK FLIES: NATURE'S LITTLE FILTERS

First to annoy us humans are the black flies, which begin emerging from mid- to late April in southern New Hampshire and last through the end of May. In northern New Hampshire, black flies appear by mid- to late May and can last into July in the mountains. One species hatches late along northern New Hampshire's large rivers in August and September. This species swarms but seldom bites.

Black flies breed exclusively in running water, both fast moving and sluggish. After a blood meal, females lay their eggs on vegetation in streams or on the water surface. Eggs will spend winter submerged in streams and hatch in the spring once the water temperatures reach 40 to 50 degrees.

The worm-shaped larvae hatch and attach themselves to submerged objects, such as rocks or grass. Larvae of some black fly species will spend the whole winter underwater. The larvae filter particles from the water column, consuming bacteria and other microorganisms as they clean the water.

"Black flies are suspension feeders," according to John Burger, a zoology professor at the University of New Hampshire who specializes in mosquitoes and black flies. "You have all this stuff suspended in the water column, and they filter it out. It's basically mostly vegetable, which they concentrate into a meat, which is then fed upon by fish and whatever else feeds on aquatic larvae."

Among the predators of black fly larvae are fish, insects, amphibians and others. The larvae are victims, as we are to black flies, and their sacrifice helps support a diverse ecosystem. A large population of adult black flies — awful as it is for us — indicates a healthy stream, because the larvae have little tolerance for pollution.

A mature black fly larva weaves a cocoon, pupates into an adult and rides a bubble of air to the water surface. Adults mate near the breeding site, and females will leave in search of blood immediately after that. Many black fly species seem to feed only on the blood of birds.

MOSQUITOES: "AQUATIC COWS"

After enduring black flies in the spring, it's time for the mosquitoes. Mosquitoes start emerging by mid-May in southeastern New Hampshire and the wave gradually spreads north, reaching the North Country by late May. Biting species of mosquitoes reach their peak of annoyance by late May through the first half of June.

Seacoast residents have it worse. One salt marsh species breeds in very large numbers and there are lots of them by late July or early August. Relief from these insects is finally felt by mid-September.

Like black flies, mosquitoes have four distinct life stages: egg, larva, pupa, and adult. But unlike black flies, mosquitoes require standing water to reproduce. Their breeding areas include vernal pools, marshes, ponds, tree holes, stumps, tires, swimming and wading pools, cans, ditches and culverts. If it holds water, mosquitoes can breed there. And generally, a wet summer means more mosquitoes.

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Once hatched, the larvae feed on vegetable matter in the water. Professor Burger calls these larvae “aquatic cows.”

“They turn plant-based organisms into meat,” Burger said. “It’s analogous to what a cow does. It takes a material which is low energy and concentrates it into a much higher energy, which then, other members of the food web take advantage of.”

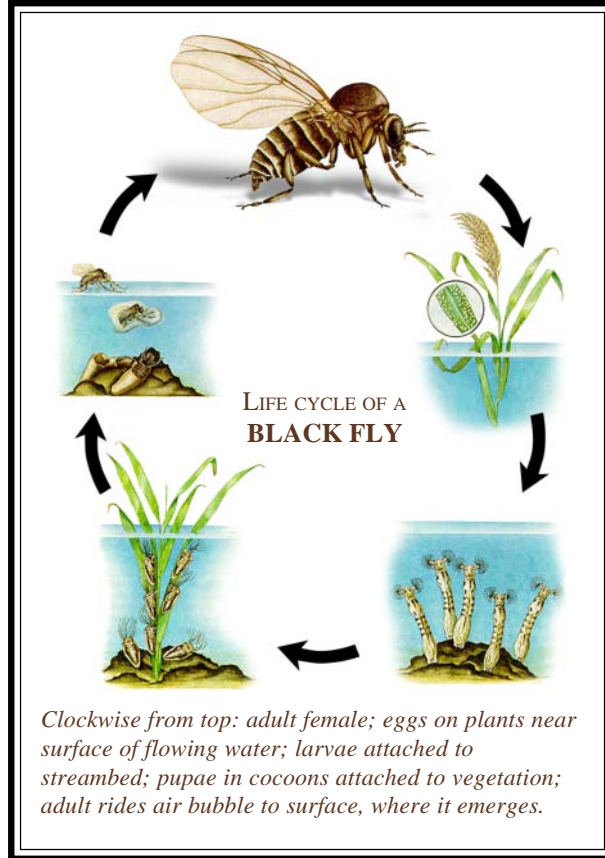
According to Professor Burger, this high-energy food, the mosquito larva, are eaten by all sorts of predators, everything from fish to beetle and fly larvae and many predacious flies.

The larvae, or wigglers, molt four times before becoming a pupa, or tumbler. The adult mosquito emerges from the pupal stage in less than a week. Adults mate before the female leaves to seek blood. In the world of black flies and mosquitoes, females get the bad rap, as they are the only ones that feed on blood. The male insects feed on the nectar of flowers.

DEFENDING THE BUG

Obviously, adult black flies and mosquitoes are an abundant food source for birds, bats and predacious flying insects, as well as parasites. As we know each spring and summer, their predators don’t impact the species enough to

ARTWORK BY BARRY FLAHEY, COURTESY OF THE CANADA DEPARTMENT OF NATIONAL DEFENSE.



alleviate our discomfort and our dislike. But are there other benefits?

From a medical standpoint, the jury is still out. There’s ongoing research to determine whether these insects might eventually benefit humans.

“There has been some work done on the chemistry of the various salivary

secretions and so forth,” Burger said. “It’s well known now that some of the proteins found in the saliva are pharmacologically very active. We don’t really know yet the extent to which any of these substances will ultimately prove to be useful in medicine; but it’s a good idea to keep your options open.”


The mosquito’s popularity with fish is certainly beneficial to people who fly fish. According to Mark Beauchesne, who heads Fish & Game’s Let’s Go Fishing Program, the mosquito is imitated by many fly-tyers.


Beauchesne offers his own defense of black flies by asking the question: “What’s worse, black flies or shoveling snow.” He supports black flies because they “are a part of fishing. They are a part of the experience of being out there.”


Professor Burger’s defense of the insects supports the ecological benefits.


“I guess I come down on the good side, if only because annoyance tends to be fairly temporary,” Burger said. “At least in terms of black flies, those larvae are in the stream for long periods of time, filtering the water column and providing food. The adults don’t live all that long. Mosquitoes are the same way.”


Choose Your Defense!


 **Deet (N, N-Diethyl-3-Methylbenzamide):** Formulas with 20 to 30 percent are effective unless in a heavily infested area. Works on both mosquitoes and black flies. Apply higher concentrations to clothing to avoid skin irritations.

 **Piperidine:** Not yet on the market; currently being tested by the U.S. military.


 **Permethrin:** Soaking clothes in this insecticide can provide protection through several washings. Many manufacturers also sell outdoor clothing impregnated with Permethrin.


 **Oil of citronella:** Found in candles, torches and coils that are burned to produce a smoke that deters the bugs. It’s usually less effective than repellents applied directly to the clothes or body.

 **Clothing:** Black flies and mosquitoes are less attracted to light colors, such as whites, yellows or light blues. Black flies can find any exposed flesh, so keep shirtsleeves and front buttoned and tuck pant legs into socks or boots. Shoulder-length headnets provide excellent protection.

 **Bug zappers:** There’s no evidence that they really control black

flies and mosquitoes. Instead, they’re probably frying larger insects that feed them.

 **Electronic mosquito repellents:** Several laboratories have found the devices are completely ineffective at repelling mosquitoes.

 **Avon Skin-So-Soft:** A hung jury. Studies have proven that there is no scientific evidence as to its effectiveness but can thousands of well-free customers be wrong? Individual skin chemistry varies widely, so it may indeed work for some folks in low bug areas. ■

PROTECT YOURSELF

You may know and even appreciate black flies and mosquitoes now, but as they swarm around your head this spring, you still have one thing on your mind: It's us or them.

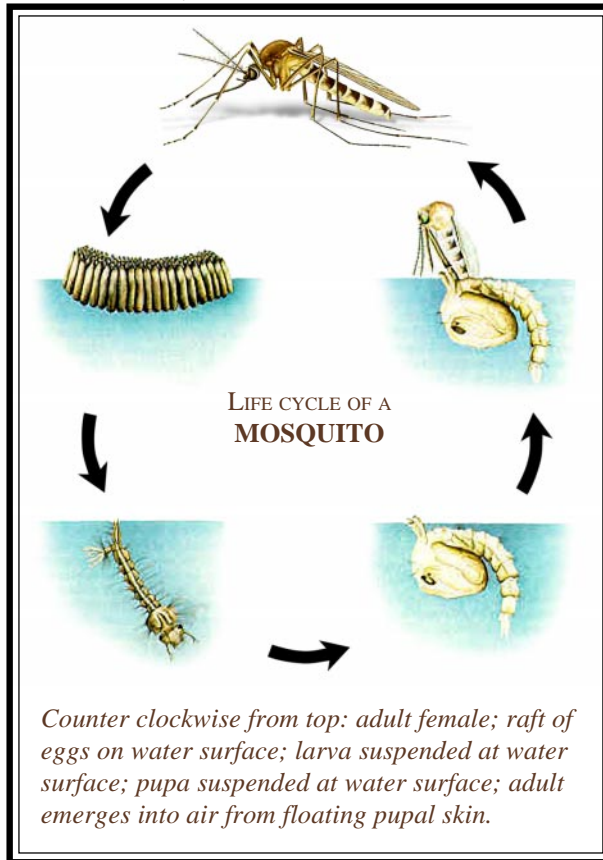
OFFENSE: There are several methods of controlling mosquitoes and black flies on a large scale, but most of these methods should be done by someone who is certified by the New Hampshire Department of Agriculture, Markets and Food. One recent development that is having a substantial impact on the control of these insects is the formation of a microbial pathogen: *Bacillus thuringiensis* variety *israelensis* (BTI). It's a spore-forming bacterium found naturally in soil. It kills only the larvae of mosquitoes, black flies and a group of midges. The good thing about this larvicide is that it is not toxic to humans or wildlife and won't contaminate the water.

The AMERICAN MOSQUITO CONTROL ASSOCIATION has a few other offensive strategies:

- Remove tin cans, old tires, buckets, unused plastic swimming pools and other things that can collect water.
- Don't let water accumulate at the base of flower pots or pet dishes for more than two days.
- Remove and standing water under or around structures. Keep rain gutters clear of debris.
- Change water in bird baths and wading pools at least once a week. Stock ornamental pools with top feeding predacious minnows.
- Drain or fill tree holes and stumps with mortar.
- Eliminate standing water around animal watering troughs.
- Irrigate lawns and gardens carefully to prevent build-up of standing water.
- Install screens that have a 16-18 mesh.

DEFENSE:

Black flies are only active during the day. Avoid going out during the morning and afternoon hours when



they are at their peak. Try venturing out at the crack of dawn, mid-day, or after sunset. And remember that black flies really like humid days, especially before a storm.

Mosquitoes are most active at dusk and on warm, cloudy days, so during the brief time of season when black flies and mosquitoes co-exist, you may need a bomb shelter.

What About

West Nile Virus?

While there are a few benefits from mosquitoes – namely their place in the food chain – one drawback has surfaced on this continent in recent years: West Nile encephalitis. It's an inflammation of the brain caused by a virus transmitted by mosquitoes, which get it by biting infected birds.

So far, the risk of getting severely sick is pretty small. According to the Centers for Disease Control, even in areas where mosquitoes carry the virus, very few mosquitoes – much less than 1 percent – are infected. If the mosquito is infected, less than 1

Mosquitoes enjoy hanging out on tall grass or vegetation along wooded areas. Avoid these areas, or expect the worst if you venture near.

Use screens on your home and make sure there are no holes. These buggers can get through just about anything.

Space sprays (with pyrethrum or synthetic pyrethroids) can be used for temporary relief, but it will be very temporary.

Outdoor foggers can also provide a brief respite. Hand-held foggers containing pyrethrum or malathion can be used; there are also attachments available for tractors and lawn mowers. But strong-flying black flies may escape the fogging in time to return for a meal later on. ■

WANT TO LEARN MORE?

THE AMERICAN MOSQUITO CONTROL ASSOCIATION.

www.mosquito.org.

Mosquito Bytes.

www.whyfiles.org/016skeeter/kill.html.

Habits and Control of Mosquitoes, Black Flies & Biting Gnats in New Hampshire. Publication by the UNIVERSITY OF NEW HAMPSHIRE COOPERATIVE EXTENSION. 603-862-2346.

Manufacturers of protective mesh clothing: www.bugbaffler.com, www.insectout.com

percent of people who get bitten and become infected will get severely ill. The chances you will become severely ill from any one mosquito bite are extremely small. The virus doesn't seem to spread from people-to-people, or from birds to people.

Health experts advise that the best way to protect yourself from the West Nile virus is by protecting yourself from mosquitoes. Follow the tips in the accompanying sidebar.

For more information, visit www.cdc.gov/ncidod/dvbid/westnile or www.dhhs.state.nh.us/commpublichealth/WestNile.nsf, or call 866-273-6453. ■