



Maryland's Black Fly Program

Helpful Information and FAQs

Why is Maryland treating Washington County for Black Flies?

In response to black fly concerns from citizens in Washington County, Maryland, Governor Larry Hogan has allocated \$200,000 for a black fly suppression pilot project ([House Bill 870](#)), directed by Maryland Department of Agriculture (MDA) and Maryland Department of Natural Resources (DNR) in conjunction with University of Maryland Department of Entomology. The pilot black fly treatment and monitoring project will be implemented this summer (2017) on the Potomac River in Washington County

Planned Treatment Method

Bacillus thuringiensis israelensis (Bti) will be applied by helicopter. While the schedule is subject to change, our preliminary scheduling is for five, monthly applications beginning August 2017. Bti is a naturally occurring soil bacterium that has been demonstrated to be non-toxic to humans, mammals, birds, fish and most invertebrates. Maryland's program is modeled heavily on [Pennsylvania's program](#), which has been in effect since the 1980s.

Treatment Areas

Treatment will focus on the the following areas of the Potomac River in Washington County: Williamsport and Harpers Ferry to Brunswick. [Map](#)

What product will be used?

The insecticide that will be used for this project is [Vectobac 12 AS](#). The active ingredient is Bti.

Is Bti safe?

The pesticide, Vectobac 12 AS was chosen because of its effectiveness for this use and because it is harmful to a very limited variety of aquatic organisms that only includes midge larvae, black fly larvae, mosquito larvae and a few other aquatic Dipteran (flies) insects. It is not harmful to fish, crabs or other aquatic invertebrates. [More Information](#)

Monitoring

[Maryland Department of Natural Resources](#) biologists will conduct biomonitoring of aquatic macroinvertebrates and fish in selected streams to ensure there is no impact on the environment and review the effectiveness of the spraying. For more information, contact Maryland Department of Natural Resources (Access.DNR@maryland.gov).

Spray Notification

The Maryland Department of Agriculture will manage the aerial spray contract and issue spray notifications. [Click here to sign up for program updates and spray notifications](#). For more information, contact Brian Prendergast brian.prendergast@maryland.gov.

What are Black flies?

While black flies are small (2-5 mm length), they can have a big impact on outdoor activities. Some black flies (Diptera: Simuliidae) can impact outdoor recreation and tourism cause serious by their persistent biting and swarming behavior. The black fly life cycle has four stages: egg, larva, pupa, and adult. All are aquatic except the adults, which leave the water to search for food and mates. Larval growth is very temperature dependent, with relatively slow growth during the cold winter months and very rapid growth during warm summer water temperatures.

The aquatic stages of black flies are often abundant organisms in river ecosystems, where the larvae filter and eat fine food particles from the water column. The immature stages of black flies are aquatic and exclusively inhabit flowing waters. However, black flies are not found in lakes, ponds, swamps, and other standing water habitats. Stream flow is essential for transporting food and oxygen to the immature stages. Black flies can play in important role in local food chains where they are preyed upon by many insect predators, fish, amphibians and birds.



Female black fly taking a blood meal
(Photo credit: Oklahoma State University)



Further Reading

- Adler, P.H. and K.C. Kim. 1986. The Black Flies of Pennsylvania (Simuliidae, Diptera): bionomics, taxonomy, and distribution. Penn. State Univ. Agric. Exp. Stn. Bull. 856:1-88.
- Adler, P.H., Currie, D.C. and D.M. Wood. 2004. The Black Flies (Simuliidae) of North America. Comstock Pub. Assoc. 960 pp.
- Crosskey, R.W. 1990. The Natural History of Black Flies. John Wiley, Chichester, U. K. Davies, J.B. Black flies (Diptera:Simuliidae); available from <http://www.entomologist.free-online.co.uk/blackflies.asp>; Internet.
- Green, S. Black Flies and Their Control; available from http://www.ento.psu.edu/extension/factsheets/black_flies_control.htm ; Internet.
- Kim, K.C. and R.W. Merritt (eds.). 1987. Black flies: Ecology, population management, and annotated world list. Pennsylvania State University Press, University Park, PA. 528 pp.

What is Bti - *Bacillus thuringiensis israelensis*?

Bacillus thuringiensis subsp. *israelensis* (*Bti*) is a naturally occurring soil bacteria used as a microbial insecticide to control the spread of vector-borne diseases, protect public health, and manage insect pest species. *Bti* was first discovered in a stagnant pond in Israel in 1976 (Margalit and Dean 1985). Initial testing of *Bti* revealed acute toxicity to mosquitoes (Goldberg and Margalit 1977) and black flies (Undeen and Nagel 1978). Further research demonstrated that *Bti* is nontoxic to humans, mammals, birds, beneficial insects, fish, plants, and most aquatic organisms (EPA 1998 *Bti* EG2215 Factsheet). *Bti* an ideal pesticide with greatly reduced environmental impacts in comparison to man-made chemical insecticides. In addition, *Bti* is species specific, breaks down rapidly, limited non-target impacts (de Barjac and Sutherland 1990), There are 26 *Bti* products in the United States with some of the following trade Names: Vectobac, Teknar, Aquabac, Bactimos, LarvX, etc.

Bti application for black fly control

Bti is applied by via aerial spraying or boat spraying at a safe rate specified by the United States Environmental Protection Agency in the form of liquid. *Bti* is currently being used in several states to control black flies and mosquitos. Both Pennsylvania and West Virginia have large black fly suppression programs and use *Bti* as the treatment. *Bti* is also currently being used to suppress mosquito populations throughout Maryland.

How *Bti* impacts black flies

Black flies must actively ingest *Bti* in order for the material to be effective. *Bti* is a spore-forming bacterium that produces protoxins in the form of parasporal protein crystals. *Bti* works best in black flies with alkaline guts because the protoxins become activated into highly toxic delta-endotoxins. The endotoxins cause a rapid breakdown in the lining of the midgut and necrosis of skeletal muscles, resulting in paralysis and mortality of target insect pests. *Bti* is nontoxic to other non-target species due to their acidic digestive system.

Non-target impacts of *Bti*

Research has demonstrated that *Bti* is nontoxic to humans, mammals, birds, fish (trout and bluegill), and most invertebrates when properly applied (EPA 1998 Reregistration Eligibility Decision). Data from a large number of studies indicate that *Bti* can be used in a carefully managed treatment program to selectively control insect pest and vector species with minimal adverse environmental impacts (Jackson et al. 2002), (Laird et al. 1990).



Further Reading

- de Barjac H. and D.J. Sutherland (eds.). 1990. Bacterial control of mosquitoes and black flies: Biochemistry, genetics and applications of *Bacillus thuringiensis israelensis* and *Bacillus sphaericus*. Rutgers University Press, New Brunswick, NJ. 349 pp.
- Environmental Protection Agency (EPA). 1998. EPA *Bacillus thuringiensis* subspecies *israelensis* stain EG2215 Factsheet; available from http://www.epa.gov/pesticides/biopesticides/ingredients/factsheets/factsheet_006476.htm.; Internet.
- Environmental Protection Agency (EPA). 1998. EPA Reregistration Eligibility Decision (RED) *Bacillus thuringiensis* EPA738-R-98-004; available from <http://www.epa.gov/oppsrrd1/REDS/0247.pdf>
- Goldberg, L.J. and J. Margalit. 1977. A bacterial spore demonstrating rapid larvicidal activity against *Anopheles sergentii*, *Uranotaenia unguiculata*, *Culex univittatus*, *Aedes aegypti* and *Culex pipiens* complex. *Mosquito News* 37: 355-358.
- Jackson, J.K., R.J. Horwitz and B.W. Sweeney. 2002. Effects of *Bacillus thuringiensis israelensis* on black flies and nontarget macroinvertebrates and fish in a large river. *Transactions of the American Fisheries Society* 131: 910-930.
- Laird, M., L.A. Lacey and E.W. Davidson (eds.). 1990. *Safety of Microbial Insecticides*. CRC Press, Inc. Boca Raton, Florida. 259 pp.

Would you like to be notified of upcoming Black fly treatments in Washington County?

Based on a request from Washington County and Governor Larry Hogan, Maryland Department of Agriculture and Maryland Department of Natural Resources personnel will be begin a pilot project for treating for black flies on the following areas of the Potomac River: Williamsport and Harpers Ferry to Brunswick. While the schedule is subject to change, our preliminary scheduling is for five, monthly applications beginning August 2017.

Proposed dates spray dates will be released via press release once determined. We will provide as much advance notice as possible but please understand that changes can be caused up the last minute due to weather or other unforeseen conditions. [Click here to sign up for program updates and spray notifications.](#)

Tips for Avoiding Black Fly bites

- Avoid areas of high black fly infestation.
- Avoid unnecessary outdoor activities at dawn and dusk when black flies are most active.
- Wear long pants, long-sleeve shirt and hat when outdoors.
- Wear light-colored clothing because black flies are attracted to dark colors.
- Use black fly repellents containing DEET. Consult a physician before applying DEET to young children.
- Restrict the outdoor play of your children if black flies are present.
- [Additional personal protection tips](#)

Black Fly Links

- [North American Black Fly Association](#)
- [University of Maryland Department of Entomology Black Fly Research](#)
- [Pennsylvania Black Fly Suppression Program](#)
- [Los Angeles County \(CA\) West Vector Control District Black Fly Control Page](#)
- [Metropolitan Mosquito Control District \(Minnesota\) Black Fly Control Page](#)

For more information, or to sign up to receive email updates about the program, visit the Maryland Department of Agriculture's Black Fly Pilot Program Webpage:

<http://mda.maryland.gov/plants-pests/Pages/Black-Fly-Program.aspx>