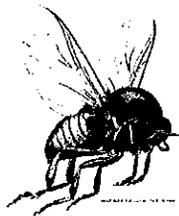


Black Fly Control, the Adirondack Experience

By MARY S. RUTLEY

Adironck visitors and residents alike know black flies and yearn for their control. Identifying the pest and learning its biology is key to success. Then the choice of Bti for safe, effective control is a natural decision. The implementation of a program is equally im-



Black fly adult. The biting fly encountered in the Adirondacks is the female seeking a blood meal

portant. This article describes the how-to of implementing a successful program in New York State as well as providing information about the Adirondack control programs and some of the Adirondack solutions to controlling the black fly.

In "Black Fly Control, the Adirondack Way" in the last issue of *AJES*, the use of Bti (*Bacillus thuringiensis* variety *israelensis*) as a pesticide was described.

Here's a review of black fly biology and control to refresh your memory. Adult black flies are found in the Adirondacks during their season from mid-May through July. The bites of the female flies cause discomfort and may lead to secondary infections but do not transmit disease in temperate climates. The larval stage provides the best opportunity for controlling this pest before it becomes a flying insect.

Since these immature flies feed by filtering microscopic particles from the

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VectoBac® 12AS

Biological Larvicide
Aqueous Suspension

Active Ingredient:
Bacillus thuringiensis, subspecies *israelensis*, 1200 International Toxic Units (ITU) per mg (Equivalent to 4.84 billion ITU per gallon, .279 billion ITU per liter) 1.2%
Inert Ingredients 98.8%
Total 100.0%

EPA Reg. No. 73049-38
EPA Est. No. 33762-1A-001

List No. 5605

Components of the VectoBac pesticide label

Above: Product name and information on Bti

Above right: Signal words and precautions required on the Bti label. The signal words warning Caution are typical of pesticides presenting the least hazard.

Right: Directions for use in black fly control. The Molloy-Struble method provides calculations to adjust for water temperature differences.

KEEP OUT OF REACH OF CHILDREN
CAUTION

For MEDICAL and TRANSPORT Emergencies ONLY
Call 24 Hours A Day 1-877-315-9819. For All Other
Information Call 1-800-323-9597.

1.0 STATEMENT OF PRACTICAL TREATMENT

If in Eyes: Flush with plenty of water. Get medical attention if signs of irritation persists.
If on Skin: Wash thoroughly with plenty of soap and water. Get medical attention if signs of irritation persists.

2.0 PRECAUTIONARY STATEMENTS

2.1 HAZARD TO HUMANS (AND DOMESTIC ANIMALS)

CAUTION
Hazards to Humans
Harmful if absorbed through skin. Causes moderate eye irritation. Avoid contact with skin, eyes, or clothing. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash contaminated clothing before reuse.

Suggested Rate Range*

| Black flies Habitat | VectoBac 12AS |
|--|---------------------|
| Streams | |
| stream water** (-ppm) for 1 minute exposure time | 0.5 - 25 mg/liter |
| stream water** (-ppm) for 10 minutes exposure time | 0.05 - 2.5 mg/liter |

**Use higher rate range when stream contains high concentration of organic materials, algae, or dense aquatic vegetation.

**Discharge is a principal factor determining carry of Bti. Use higher rate or increase volume by water dilution in low discharge rivers or streams under low volume (drought) conditions.

VALLEY BIOSCIENCES
813 TECHNOLOGY WAY
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moving water they inhabit, Bti, a natural soil bacterium, is an effective control as an aqueous suspension marketed as VectoBac 12AS. See the illustration from the Bti product label for additional information.

The microscopic protein crystals of Bti are toxic in the alkaline gut of the black flies but most other stream insects are unaffected. After monitoring a habitat for the presence of larvae, the technician measures the stream discharge, mixes the product, and applies the mixed dose by hand or sprayer. Black fly development and, therefore, product application is temperature dependent but this selective pesticide (product) normally works within twenty-four hours to poison and kill the target insect. The technician returns the day after treatment to assess the success of the treatment.

How-to: Implementing a Control Program

The Decision Process

Town meetings communicate information for local citizens and initiate open discussions about control programs. The taxpayers need to know the facts so they can assist the Town with the decision making process. When a decision is made for control, the Town must choose whether to register as a pesticide business or contract with a private corporation. If the Town opts to set up its own business, the Town Board may need the expertise from other towns and consultants while identifying local persons to staff the program. In the Adirondacks two private businesses, VectorTech Inc. of Brant Lake and Adirondax Service in Schroon Lake currently contract for control programs.

Where to Control the Fly

Regardless of who is chosen to implement a program, the Town must establish the area where black flies will be controlled. Population centers and recreational areas are normal focal points for control. An area of twelve square miles minimum is usually required. The area



This 7.5-minute topographic map shows a hypothetical 12-square-mile control area with central target area and shaded buffer zone. The center of the proposed area is Higley Dam in Colton.

initially plotted for control is a circle with a radius of two miles. An inner circle with a one-mile radius is the primary target area. The outer mile of the two-mile radius provides a buffer zone where treatments will occur, pest populations will be reduced, but flies from neighboring regions will be found. Black flies are strong fliers or could blow in from adjacent areas; thus a larger region must be treated for adequate control in the targeted area. In the illustration shown, the two circles drawn on a 7.5-minute quadrangle map show the limits of a hypothetical thirty-square mile area with the inner control zone and the outer buffer zone. Given the topography of Adirondack communities, these areas are often expanded to elongated ovals or irregular areas centered on major lakes or streams.

Registering the Program

Permits must be obtained from New York State Department of Environmental Conservation (DEC). Additionally,

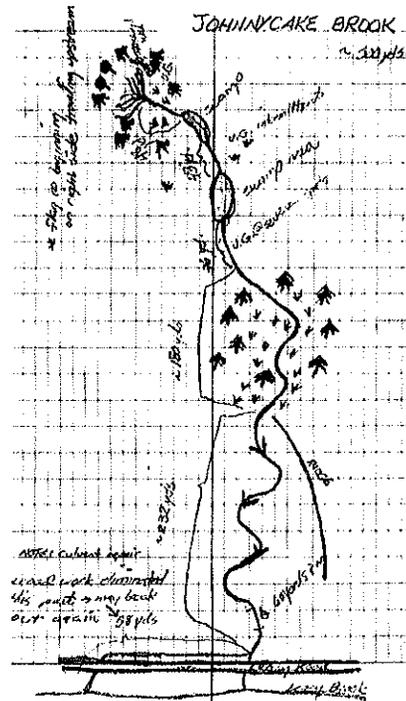
the State Environmental Quality Review Act (SEQRA) requires that a pesticide control program of this magnitude address the environmental impact of using Bti. Based on past research and experience with Bti in New York State, there are no significant environmental impacts and a Negative Declaration of Environmental Impacts is filed by the Town.

Second, the DEC requires an annual Aquatic Permit ("Permit to Use Pesticides for Control of Aquatic Insects") be filed forty-five days before treatments begin. The permit application includes maps of the streams to be treated with Bti.

Mapping Streams

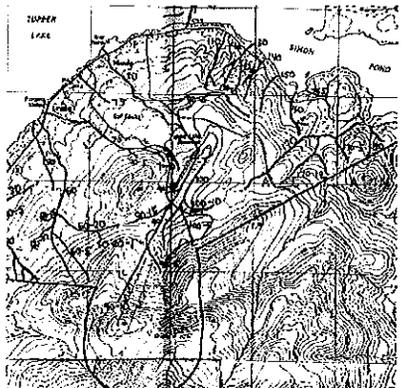
Current topographic maps normally show about 50% of the streams that must be mapped as potential breeding sites of the black fly. Minute 'streams' or trickles such as roadside ditches or tire tracks left from logging operations may provide prime habitat. Now dry, intermittent streams may contain eggs that develop when the streambed fills with seasonal runoff water again. The outlets of lakes, ponds, and impoundments created by humans or beavers provide another substantial breeding site. Scouting out all the tributaries of major streams adds to the map data. Finally assessing fly breeding sites of any major river in the treatment area is necessary. The ideal time for mapping the control area to plot streams is the autumn and these more detailed maps are the basis for the success of future treatment.

Before field mapping can begin, the boundaries of the control area are superimposed on the County Tax Maps to identify the property owners. Letters are sent to landowners for their approval to visit their property for mapping. If permission is denied, the wishes of the property owner must be respected. While obtaining access to properties, contour maps are studied to locate permanent streams and to predict locations of other intermittent or temporary streams. Finally, visits to properties verify streams and their locations. Each of these streams,



Sample stream sheet from Colton's field maps. Information on the sheet gives technicians additional directions for field conditions and treatment factors.

with tributaries, must be mapped on existing topographic maps, which are then transferred to individual stream sheets and included with the permit application. A sample stream sheet, prepared for field use by technicians, is illustrated. In towns with access to computer mapping



A portion of a stream sheet submitted with an early permit for the control area in Town of Altamont. Courtesy of John Bennett, DEC, Region 5.

FEATURE

Black Fly Control Programs 1999

(with additional towns starting programs in 2001)

| | Treatment Area (sq. mi.) | Stream Length (mi.) |
|------------------------------|--------------------------------|---------------------------|
| Clinton County | | |
| AuSable (Keeseville)* | 36 | 79 |
| Black Brook (AuSable Forks)* | 130 | 192 |
| Essex County | | |
| Chesterfield (Kesseville)* | 70 | 134 |
| Jay* | 74 | 153 |
| Keene* | 75 | 210 |
| Newcomb | 28 | 150 |
| North Elba (Lake Placid) | 85 | 250 |
| Schroon (Schroon Lake)* | 26 | 65 |
| Wilmington* | 72 | 170 |
| Franklin County | | |
| Altamont (Tupper Lake)* | 30 | 147 |
| Fulton County | | |
| Caroga (Caroga Lake) | 50 | 120 |
| Stratford | 76 | 124 |
| Hamilton County | | |
| Arietta (Piseco Lake)* | 40 | 130 |
| Benson* | 35 | 110 |
| Indian Lake | 85 | 200 |
| Inlet | 18 | 50 |
| Lake Pleasant** | 60 | 82 |
| Morehouse (Hoffmeister) | 34 | 135 |
| Wells* | 20 | 64 |
| Herkimer County | | |
| <i>Ohio</i> | 17.5 | 24.8 |
| Webb (Old Forge) | 82 | 230 |
| Jefferson County | | |
| Black River | 9 | 35 |
| Lewis County | | |
| Diana (Harrisville) | 12 | 215 |
| Watson (Chases Lake) | 12 | 25 |
| Oneida County | | |
| Forestport (Otter Lake) | 6.5 | 24 |
| St. Lawrence County | | |
| <i>Clifton</i> | 72 | 120 |
| Colton | 37 | 100 |
| <i>Fine</i> | 123 | 192 |
| Warren County | | |
| Chester (Chestertown)* | 70 | 94 |
| Horicon (Brant Lake) | 37 | 97 |

*Contract with Vector Tech, Inc. in 2001

** Contract with Adirondack Services in 2001

Italics = Proposed program to begin in 2001

technology, more sophisticated stream sheets are developed.

Getting Ready

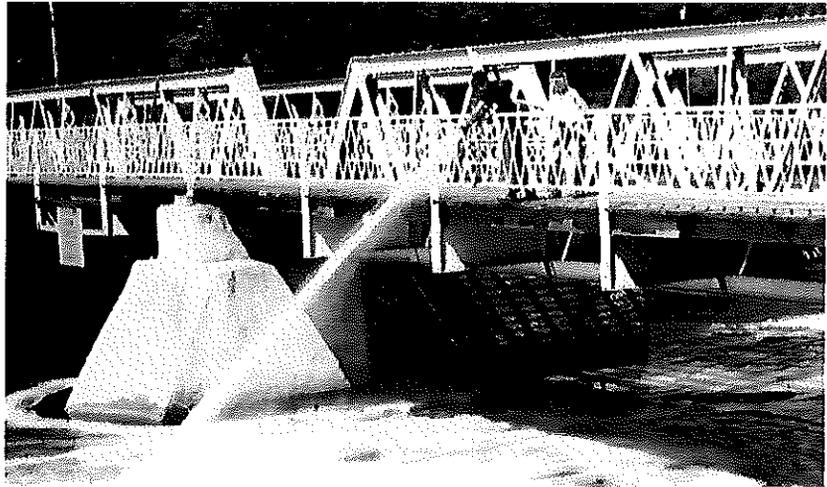
Landowner permission for treatment on the property provides access to the network of streams within the control area. Annual renewal of this permission will require subsequent mailings. A typical packet for mailing might include 1) an information sheet explaining black fly biology and use of Bti for control, 2) a description of the fieldwork involved, 3) a current label for Bti, and 4) permission forms to file with the director of the control program. Continued efforts at keeping the public informed through newspaper articles, radio interviews, and meetings are important in maintaining communication with the landowner taxpayers.

Training the Field Technicians

The persons wishing to work in a Bti control program must complete a 30-hour course and two tests to become technicians and with experience and/or additional training become certified commercial pesticide applicators. Taught by certified applicators, the DEC-approved course involves hands-on work with aquatic insects and demonstrations in the field. Four persons currently teach this core course in the Adirondacks. Black fly biology, Bti and treatment procedures, woods sense and safety are essential requirements. Additionally, the course involves acquaintance with the Pesticide Applicator Training Core Manual and the Pesticide Applicator Training Manual, Aquatic Pest Control. The DEC regional offices administer the qualifying examinations to grant technician status.

Getting into the Field

Eventually permissions are obtained, permits are filed, technicians are trained, and the office work is complete. The map for the treatment area is divided into zones for work assignments on individual streams. As soon as ice is out and streams are open, the technicians begin monitoring for black fly larvae. When the flies are in their last larval substage



Treatment in the Raquette River in Colton requires a different approach. The bridge shown here is history but the high-pressure hoses are still used to ensure adequate mixing of the Bti in the large flows on the river. Courtesy of Andrea Malik.

and still feeding, treatment should begin. Field notebooks become critical to document each treatment; record keeping is a basic requirement of the program. Thus, the black fly control is underway in the field.

The Adirondack Experience

To trace the Adirondack experience with control of black flies with Bti, I'll follow my Colton connection to the rest of the region. Colton's decision to develop a Bti program came in 1985 when Franklin Falls, Horicon, Indian Lake, and few others had established programs. As my role changed from 'bug' committee member to Bti technician, Colton chose Andrea Malik, a SUNY Potsdam graduate, to initiate the Bti program. Our pesticide training began with Lora Couture of Bib Enterprises. Lora administered the Franklin Falls program after work with field testing Bti with Dan Molloy and Robert Struble. After training in the fall, Andrea returned to map the Colton streams and I to my classroom while preparing a 30-hour course for registration with DEC. I trained Colton's technicians for two seasons before Andrea took over that role as well. Lora Couture continues to train technicians and after the Franklin Falls program ended eventually picked up the town-run North Elba program when it

was initiated. Ron Staring trains technicians in Fulton County and runs the town of Caroga control program.

In the 1980s the Tupper Lake-based Bionomics, Inc. then supplied Bti to Adirondack towns. Bionomics also trained technicians and contracted with a few towns to provide Bti programs. When the owners decided to leave the Adirondacks in 1989, the Bionomics equipment was sold to Kathleen Vanselow and Kenneth Brzozowski. Kathy had worked for Bionomics for three seasons in its control programs. The newly created Vector Tech, Inc. of Brant Lake owned by Kathy and Ken took over supplying Bti to towns, training their firm's technicians, and contracting with towns for control programs. The business has expanded from the original few towns to a dozen towns for the 2001 season. Vector Tech has a core of technicians who return yearly for the season. Both full-time and part-time positions are utilized to put together the programs that range from towns in the vicinity of Brant Lake to as far away as Tupper Lake.

The Adirondack Service, created after Bill Sutfin retired from the DEC in 1994, is the other pest control business contracting for Bti programs in the Adirondacks. The Service handles train-



Beaver dams provide obstacles to the technician working in the area and treatment problems.
Courtesy of Andrea Malik.

ing programs for recertification of pesticide applicators and the 30-hour training course for Bti applicators. In addition to the black fly control, Bill works with businesses and homeowners on structural pest problems, primarily ants and rodents. In a few communities he helps control swimmers' itch in local waterways.

The Towns

A total of twenty-seven towns completed black fly control programs in 1999 and 2000; now thirty towns are planning programs for the 2001 season. Fourteen towns contract with one of two private firms while the other towns run their own programs. Most information below was taken from the *Aquatic Insect Control Report* submitted by programs annually to the DEC in Regions 5 and 6. Because of the reporting schedule, the records for 2000 are not yet available. Some towns with treatment areas outside the Blue Line are included because of their similarity to the towns within the Adirondack Park. The table provided lists by county, the towns, the size of the control area, and the stream miles in their program. The list includes the new towns that are beginning programs this season.

The supervisors of the towns with programs were surveyed in 1999. Towns that had long-standing control programs volunteered that Bti was 'far better than any other methods.' Reasons for towns supporting the programs: 'so residents can enjoy the outdoors during the summer months' and 'tourists and seasonal residents now come early to enjoy the early summer and contribute to the economy.' Towns that depend on their seasonal visitors for much the regional prosperity are well satisfied with results of control with Bti.

Costs of Control

The primary costs of control result from the labor-intensive nature of the program. The field mapping for preparation of stream sheets is a one-time start-up expense. Information on the costs of programs was obtained in my supervisor survey while the records of product use were provided in the DEC records available. The product containing Bti costs approximately \$25 per gallon. The 1999 records indicated programs could run with as little as 14 gallons and up to 176 gallons in the larger treatment areas. Remember the usual dose for treatment in the majority of the smaller streams is a few tablespoons to part of a cup of prod-

uct. Initial reports for the 2000 season indicate that product volume was greater in 2000 because of the heavy rainfall. Colton, probably the biggest consumer of VectoBac last season, used 193 gallons because of greater volumes needed for treating the Raquette River.

From the survey, most towns reported no recent significant increases in their budgeted costs and for the fifteen towns responding, budgeted costs totaled \$432,266 for 1999.

The costs ranged from \$10,000 to \$63,600 or an average of \$28,818. Towns reporting anticipated increases generally indicated that this represented pay raises for the technicians. A few towns see an increase when they enlarge the treatment area.

To return to the list of towns, treatment areas in 1999 ranged from as small as 6.5 square miles to 130 square miles with the average, 48.3 square miles. Stream miles that are treated, however, may give a more accurate picture of the work involved in administering treatments in the control area. Remember that each stream may have been revisited several times during the program season. Based on the budget information from my 1999 survey, the total of \$432,266 covered the 1,893 stream miles for 15 towns. This cost was \$228 per stream mile. Among all towns, the stream lengths totaled 3,360 miles with the average stream miles per program at 124 miles and the range from 24 to 230 miles. Longer stream miles mean more technician time in the field.

Problems and Solutions

Stream size has frequently presented a challenge to the original method of treatment outlined in the Molloy-Struble Report. Field efficiency and the effectiveness of treatment are combined criteria for success of programs. A summer 2000 meeting in Lake Placid reviewed changing sprayer methodology from hand sprayers, back pack sprayers, and bulk tank sprayers to use of fire equipment like pumper trucks. For the smallest streams with a volume of less than 0.5 cu/ft, the hand sprayer is used to contain

several 'batches' of product to be distributed along the trickle. Backpack sprayers provide a good solution to treating along the face of a beaver dam. The high-pressure hoses of the pumper truck were used in combination with product being placed in powerhouse intakes at hydroelectric installations on the Raquette River.

One of the major concerns of any labor-intensive program is safety. Safety is addressed in the training course with consideration of problems ranging from hypothermia to sunstroke to heat exhaustion. Field crews have systems of buddy checks or more recently use radios for communication. A first aid kit goes in every field pack. More recently, one of the major field hazards was the debris left in the wake of the 1998 ice storm. Towns handled this problem according to the different conditions and land ownership. In towns where the land in question was privately owned some towns asked landowner permission to clear access and along the stream sites where treatment occurred. Clearing was done with an assortment of equipment from chain saws to bow saws plus a variety of smaller saws carried in field packs. Where most of the land was 'forever wild' state lands two technicians might be sent together to treat streams.

In the first season after the storm, field technicians may have found main access roads still inaccessible while the fallen timber was cut out on some state trails. The second season after the storm also revealed changing hazards in the landscape as dead trees continued to fall and disintegrate. Surviving trees that had bent to the ground but never straightened had new growth creating a network of obstacles to the bushwhacker.

A continuing programmatic problem is the necessity of finding seasonal workers who will stay with Bti control year after year. When prosperity provides an increasing number of full time jobs, the problem is worsened. Last year the recruitment of many workers for the 2000 United States Census drained off many potential technicians. Persons who have retired from full-time jobs may become



A tangle of red pine left in the wake of the 1998 ice storm at Higley Flow State Park, Colton.

key players in the returning workforce. In some areas of the Adirondacks, part of the workforce retains freedom by using two seasonal jobs to patch together its livelihood. Access to ski area jobs means additional employment in some parts of the Adirondacks. But with the diversity of the region, towns have developed different strategies to provide incentives for workers who return in successive years with pay raises the most common. In a few towns other seasonal jobs related to snow removal, etc. provide the work supplement. Technicians who stayed with their jobs indicated the satisfaction of being part of a team that performed a safe and useful service for the Adirondacks.

But even the directors of programs may find it necessary to find another job for the offseason. For example, three of these Adirondackers I know have combined jobs. Bti control was combined with karate instruction in non-credit programs, with a woodworking business that became Goods from the Woods, and with a manufacture of theatrical and backdrop props and murals that became Scenic Outlook Studios, Inc. Entrepreneurship is alive and well. And the black fly is increasingly controlled in the hamlets and recreational areas of the Adirondacks. But look out for those deer flies!

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