

U.S. copyright law (title 17 of U.S. code) governs the reproduction and redistribution of copyrighted material.

Fordham University Interlibrary Loan

ILLiad TN: 263529.0

VVF 150.108.156.223



Borrower: UXW

Lending String: *VYF,MNM,EYR,VLC,ZBM

Patron: Greg Corace/R5/refuges

Journal Title: Annals of the Entomological Society of America.

Volume: 61 **Issue:** 4
Month/Year: 1968**Pages:** 960-996

Article Author:

Article Title: TARSHIS; Use of Fabrics in Streams to Collect Black Fly Larvae

Imprint: College Park, Md. ; Entomological Societ

ILL Number:37953619



Call #: Q1.E66

Location: RH

ARIEL

Charge

Maxcost: \$25.00IFM

Shipping Address:

U.S. Fish and Wildlife Service
National Conservation Training Ctr/Libra
698 Conservation Way
Shepherdstown, WV 25443

Fax: 304-876-7213

E-mail: anne_roy@fws.gov

Ariel:

Use of Fabrics in Streams to Collect Black Fly Larvae^{1,2}

I. BARRY TARSHIS

Bureau of Sport Fisheries and Wildlife, Patuxent Wildlife Research Center, Laurel, Maryland

ABSTRACT

A technique is described for using strips of gauze to collect large numbers of larvae of *Cnephia dacotensis* (Dyar & Shannon), *Simulium decorum* (Walker), *S.*

venustum Say, *S. verecundum* Stone & Jamnback, and *S. vittatum* Zetterstedt from various water habitats.

Collecting black fly larvae (Simuliidae) individually from their natural habitat on vegetation, rocks, or other objects in stream beds is tedious and time consuming. When large numbers of larvae collected in this way are placed in aquariums they become entangled in the silken threads they secrete and most of them die. The following experiments were initiated in an attempt to devise a method whereby large numbers of larvae could be collected, transferred to aquariums with a minimum of handling, and more successfully reared to adults.

Preliminary studies were conducted on a concrete spillway apron during November 1964, at the Patuxent Wildlife Research Center, Laurel, Maryland (Tarshis 1965). After several hours of searching, fewer than 100 larvae of *Simulium vittatum* Zetterstedt were recovered from the apron by picking off individual specimens.

Since black fly larvae will attach to vegetation, rocks, and other materials naturally occurring in stream beds, I thought that some kind of fabric placed in the stream might attract larvae also, thereby making their collection considerably easier.

METHODS AND MATERIALS

Several pieces of coarse-mesh cheesecloth and fine-mesh nylon organdy, each 2½×3 ft, were laid out on the spillway apron and anchored along their long edges with pieces of brick. Two hr later about 100 larvae were attached to both surfaces of each piece of fabric. More larvae were attached to the cheesecloth than to the nylon organdy, probably because it was more difficult for larvae to attach to the more closely woven nylon. However, the coarse-mesh cheesecloth with its loose weave was much harder to handle after several days' exposure to flowing water.

The fabrics were left in the water for several days and then were removed from the apron, cut into 6- to 8-in. squares for ease in handling, and placed in rearing aquariums in which the water was agitated with compressed air. Of approximately 12,000 *S. vittatum* larvae collected, 3703 pupated, and from these 2834 adult flies emerged.

A 2nd attempt to use the fabric technique was made in the spring of 1965 at the Seney National Wildlife Refuge in Michigan. A 75- to 100-ft-wide spillway runoff basin was selected as the 1st test site. The floor of the basin was flat and covered with sand, gravel, and loose rock. The water depth was approxi-

mately 6 in. and the stream flow velocity was 1.27 ft/sec. Numerous larvae were seen attached to the sand, gravel, and rocks.

Since the coarse-mesh cheesecloth used at the Patuxent Center was found to be too flimsy, a finer mesh bleached gauze with 40×50 grids/in. was used.

Several 8- to 20-ft lengths of 3-ft-wide gauze were placed in the spillway basin (Fig. 1). Heavy stones were placed along the 2 selva edges of each length of gauze, so that flowing water would not wash it downstream.

Minutes after the fabric was placed on the basin floor, black fly larvae attached themselves to it. After a 24-hr period, the gauze was examined and found to be well covered with larvae in all stages of development (Fig. 2). After removal from the water the gauze was cut into 6- to 8-in. squares which were placed in either lidded, plastic-lined metal cans for transfer to the Seney laboratory for rearing or in the glass jars of a larval transport box (Tarshis 1966b) for shipment to Maryland. The jars in the transport box are so equipped that the contained water is agitated constantly.

From this 1st test site, approximately 20,000 larvae in various stages of development were taken. Of these, 5677 pupated and 4132 adults of the following species emerged: *Cnephia dacotensis* (Dyar & Shannon), *Simulium decorum* (Walker), *S. venustum* Say, and *S. vittatum*.

For a 2nd field trial at Seney, the middle of a 40-ft-wide × 75-ft-long spillway runoff basin laden with various sized rocks was selected. The rocks were submerged in 6-8 in. of water and were well covered with larvae. The stream velocity varied from 1.03 to 2.40 ft/sec. A 15-ft-long piece of gauze was draped over the rocks and anchored along the selva edges with heavy stones. During a 24-hr period, approximately 18,000 larvae collected on the gauze strip. Of these larvae, 5105 pupated and 3100 adult flies emerged. Species included were *C. dacotensis*, *S. decorum*, *S. venustum*, and *S. vittatum*.

A 15-ft-wide × 150-ft-long spillway runoff basin laden with loose rock, twigs, decaying vegetation, and logs submerged in 6-8 in. of water was selected for the 3rd test site at Seney. The stream velocity varied from 0.29 to 0.66 ft/sec. The rocks, vegetation, and other objects in the basin were well laden with black fly larvae. One 15- and one 20-ft-long strip of gauze were anchored on the rocks and left in the water for 24 hr. From this site, approximately 13,000 larvae were collected. Of these, 4773 pupated and

¹ Diptera: Simuliidae.

² Accepted for publication September 7, 1967.

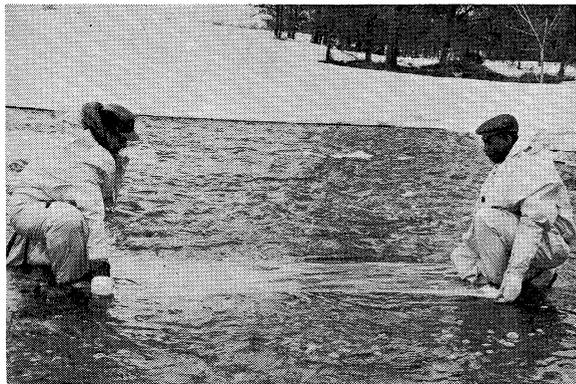


FIG. 1.—Placement of gauze strip in stream bed for the collection of black fly larvae. Note waterproof antiexposure suits for work in cold water (Tarshis 1966a).

2636 adults emerged, including specimens of *C. dacotensis*, *S. decorum*, *S. venustum*, and *S. vittatum*.

For a 4th trial, a 2-ft-wide \times 75-ft-long runoff stream created by overflow water from a culvert and laden with cattails, *Typha latifolia* L.; twigs; and limbs of fallen trees was chosen. The vegetation contained many larvae and was partially or completely submerged in 8–12 in. of water flowing at a velocity of 1.27–1.52 ft/sec. A 15-ft-long strip of gauze was placed on the surface of the stream over the vegetation, and secured at the selvage edges to some standing cattails along the stream banks. The gauze was exposed for 24 hr. Of the 9000 larvae recovered, 2569 pupated, and 2169 adults emerged, including specimens of *C. dacotensis*, *S. decorum*, *S. venustum*, and *S. vittatum*.

Strips of gauze were exposed at several other sites at the Seney Refuge for the purpose of collecting larvae for shipment to Maryland. From these exposed strips, 32,000 larvae were collected and successfully shipped from Michigan to Maryland. Of the shipped larvae, 9087 pupated, and 6072 adult flies emerged. Included were specimens of *C. dacotensis*, *S. decorum*, *S. venustum*, *S. verecundum* Stone & Jamnback, and *S. vittatum*.

DISCUSSION

These studies showed that the use of fabric can be



FIG. 2.—Recovery of black fly larvae on a strip of gauze exposed for 24 hr in a stream bed.

most advantageous in collecting larvae from a variety of habitats. This technique proved suitable for the collection of large numbers of larvae with a subsequent high yield of adult flies.

REFERENCES CITED

- Tarshis, I. B. 1965. A simple method for the collection of black fly larvae. *Bull. Wildlife Dis. Ass.* 1: 8.
 1966a. A protective suit for aquatic research. *J. Wildlife Manage.* 30: 421–2.
 1966b. A method of shipping larvae of *Simulium vittatum* long distances. *Ann. Entomol. Soc. Amer.* 59: 866–7.

Annual Meeting of The Entomological Society of America

The Statler Hilton Hotel, Dallas, Texas 75201

December 2-5, 1968