



## **North American Black Fly Association Seventh Annual Meeting**

### *Program Agenda*

February 4-6, 2009  
Archbold Biological Station  
Lake Placid, Florida

*John P. Walz, President*

# *Schedule of Presentations and Events*

## **Wednesday, February 4**

1:00 PM – 1:30 PM	OPENING COMMENTS AND INTRODUCTION OF PARTICIPANTS <b>John Walz</b> , Metropolitan Mosquito Control District St. Paul, MN
1:30 PM – 1:50 PM	TECHNICAL SPECIFICATIONS FOR PONTOON BOAT APPLICATIONS TO MEDIUM/LARGE RIVERS (COLORADO RIVER) <b>Christopher T. Bramley</b> , Clark County Vector Control Las Vegas, NV
1:50 PM – 2:30 PM	HISTORY OF MOSQUITO AND BLACK FLY CONTROL IN MINNESOTA (INCLUDES A 20-MINUTE VIDEO) <b>John Walz</b> , Metropolitan Mosquito Control District St. Paul, MN
2:30 PM – 3:00 PM	<b>BREAK</b>
3:00 PM – 4:30 PM	TOUR OF ARCHBOLD BIOLOGICAL STATION (should take 1 ½ hours, long pants and closed toed shoes are recommended)
5:00 PM – 6:00 PM	<b>SOCIAL HOUR</b>
6:00 PM	<b>BBQ DINNER</b>

## **Thursday, February 5**

6:30 AM – 8:00 AM	CONTINENTAL BREAKFAST IN DINING ROOM
9:00 AM – 9:20 AM	CURRENT STATUS OF THE BLACK FLY GENOME AND PROTEOME PROJECTS <b>Charles Brockhouse</b> <sup>1</sup> , Rory Post <sup>2</sup> , and John Colbourne <sup>3</sup> <sup>1</sup> Creighton University, Omaha, NE, <sup>2</sup> London School of Hygiene and Tropical Medicine, London, UK, <sup>3</sup> Indiana University, Bloomington, IN
9:20 AM – 9:40 AM	BACTIMOS PT - A NEW OPTION IN MIDGE SUPPRESSION <b>Elmer W. Gray</b> <sup>1</sup> , Robert A. Fusco <sup>2</sup> , and Candace G. Royals <sup>2</sup> <sup>1</sup> University of Georgia, Athens, GA, <sup>2</sup> Valent BioSciences Corporation, Libertyville, IL

## Thursday, February 5 (continued)

- 9:40 AM – 10:00 AM VERTICAL DISTRIBUTION OF BITING FLIES IN BOREAL FORESTS OF SWEDEN  
**Dustin A. Swanson**<sup>1</sup>, Peter H. Adler<sup>1</sup>, and Björn Malmqvist<sup>2</sup>  
<sup>1</sup>Clemson University, Clemson, SC, USA, <sup>2</sup>Umeå University, Umeå, Sweden
- 10:00 AM – 10:30 AM **BREAK**
- 10:30 AM – 10:50 AM MOSQUITO AND BLACK FLY SURVEILLANCE METHODS, MAPS AND MORE  
**Carey LaMere**, Metropolitan Mosquito Control District  
St. Paul, MN
- 10:50 AM – 11:10 AM LARVAL MORPHOLOGY OF *SIMULIUM BIVITTATUM*  
**Kenneth Pruess**, University of Nebraska, Lincoln, NE
- 11:10 AM – 11:30 AM BLACK FLY PATHOGENS  
**John McCreadie**<sup>1</sup> and Peter Adler<sup>2</sup>  
<sup>1</sup>University of South Alabama, Mobile, AL, <sup>2</sup>Clemson University, Clemson, SC
- 11:30 AM – 11:50 AM THE INFLUENCE OF ANTHROPOGENIC DISTURBANCE ON TWO GROUPS OF LOTIC FILTER-FEEDING ORGANISMS, HYDROPSYCHIDAE AND SIMULIIDAE, IN THE SOUTHERN INNER PIEDMONT ECOREGION OF GEORGIA  
**David Rouse**<sup>1</sup>, Jay Overmyer<sup>1</sup>, Aaron Fisk<sup>2</sup>, and Duncan Hughes<sup>3</sup>  
<sup>1</sup>University of Georgia, Athens, GA, <sup>2</sup>University of Windsor, Windsor, ON, <sup>3</sup>North Georgia Technical College, Clarkesville, GA
- 12:00 PM – 1:30 PM **LUNCH**
- 1:30 PM – 1:50 PM REPRODUCTIVE PROTEOMICS  
**Dathe Benissan-Messan**, Creighton University, Omaha, NE
- 1:50 PM – 2:10 PM ~~ANALYSIS OF IRISH BLACK FLY POPULATIONS~~  
**(not presented)**
- 2:10 PM – 2:30 PM EMERGENCE PATTERNS OF *SIMULIUM JENNINGSI* IN HUNTERDON COUNTY, NEW JERSEY  
**Tadhg Rainey**<sup>1</sup> and Scott Crans<sup>2</sup>  
<sup>1</sup>Hunterdon County Department of Health, Flemington, NJ  
<sup>2</sup>Rutgers University, New Brunswick, NJ
- 2:30 PM – 3:00 PM **BREAK**

## Thursday, February 5 (continued)

- 3:00 PM – 3:20 PM      MICROSATELLITE ANALYSIS OF THE *SIMULIUM ARCTICUM* SPECIES COMPLEX FROM MONTANA, USA  
**Ida M. Conflitti**<sup>1</sup> and Douglas C. Currie<sup>1,2</sup>  
<sup>1</sup>University of Toronto, Toronto, ON, <sup>2</sup>Royal Ontario Museum, Toronto, ON
- 3:20 PM – 3:40 PM      COMPARISON OF LARVAL MORTALITY IN FIELD APPLICATIONS CONDUCTED AT LEGAL SUNSET AND MID-MORNING  
**Elmer W. Gray**<sup>1</sup>, Robert A. Fusco<sup>2</sup> and Ray Noblet<sup>1</sup>  
<sup>1</sup>University of Georgia, Athens, GA, <sup>2</sup>Valent BioSciences Corporation, Libertyville, IL
- 3:40 PM – 4:00 PM      BARBARIANS AT THE GATE: THE RESPONSE OF BLACK FLIES TO CLIMATE CHANGE IN NORTHERN NORTH AMERICA  
**Douglas C. Currie**, Royal Ontario Museum, Toronto, ON
- 4:05 PM – 4:20 PM      **GROUP PICTURE**
- 5:00 PM – 6:00 PM      **SOCIAL HOUR**
- 6:00 PM      **DINNER**

## Friday, February 6

- 6:30 AM – 8:00 AM      CONTINENTAL BREAKFAST IN DINING ROOM
- 8:30 AM – 9:00 AM      BUSINESS MEETING AND GENERAL DISCUSSION

<http://entweb.clemson.edu/biomia/nabfa/>

### ***Thank You***

*Thanks to Archbold Biological Station for allowing NABFA to host our meeting at their facility and Penny DeVane for help in organizing this meeting. Thanks to Carey LaMere and Diann Crane for help with the program.*



## **North American Black Fly Association Seventh Annual Meeting**

### ***Meeting Abstracts***

February 4-6, 2009  
Archbold Biological Station  
Lake Placid, Florida



## ***Presentations Titles with Abstracts for the 2009 NABFA Meeting***

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TECHNICAL SPECIFICATIONS FOR PONTOON BOAT APPLICATIONS TO MEDIUM/LARGE RIVERS (COLORADO RIVER)

**Christopher T. Bramley**, Clark County Vector Control, Las Vegas, NV

*No abstract submitted*

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HISTORY OF MOSQUITO AND BLACK FLY CONTROL IN MINNESOTA

**John Walz**, Metropolitan Mosquito Control District, St. Paul, MN

Metropolitan Mosquito Control District (MMCD) celebrated its 50<sup>th</sup> anniversary in 2008. The MMCD black fly program will celebrate its 25<sup>th</sup> year in 2009. Several historical photos will be shared along with a 20-minute video documentary.

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CURRENT STATUS OF THE BLACK FLY GENOME AND PROTEOME PROJECTS

**Charles Brockhouse**<sup>1</sup>, Rory Post<sup>2</sup>, and John Colbourne<sup>3</sup>

<sup>1</sup>Biology Department, Creighton University, Omaha, NE

<sup>2</sup>Natural History Museum and London School of Hygiene and Tropical Medicine, London, UK <sup>3</sup>Center for Genomics and Bioinformatics, Indiana University, Bloomington, IN

Laboratory work on the black fly genome and proteome projects have been underway for over one year. The genome project is initially focusing on chromosome arm III of *Simulium squamosum*. The Post laboratory has constructed and characterized a genomic BAC library from wild-collected *S. squamosum*. DNA from III has been microdissected, and amplified. This DNA is serving as a probe in differential hybridizations to choose III-specific BAC clones. The clones will be sequenced using the massively parallel sequencing capabilities of the Center for Genomics and Bioinformatics of Indiana University (Bloomington). The other focus of the project is the transcriptome of *Simulium vittatum* s.str. RNA from egg masses, mixed-stage larvae, male and female late instar larvae, pupae, and male and female adults is being used to produce cDNAs which will also be shotgun sequenced at Bloomington. We anticipate that the raw data transcriptome will be available to begin annotation soon.

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BACTIMOS PT - A NEW OPTION IN MIDGE SUPPRESSION

**Elmer W. Gray**<sup>1</sup>, Robert A. Fusco<sup>2</sup> and Candace G. Royals<sup>2</sup>

<sup>1</sup>University of Georgia, Athens, GA, <sup>2</sup>Valent BioSciences Corporation, Libertyville, IL

Non-biting midges of the family Chironomidae (Diptera) have long been recognized for their extensive nuisance potential. Operationally, midge control has proven to be difficult and labor intensive with a limited number of active ingredients available as effective

control options. Valent BioSciences has developed a new, extruded pellet formulation of *Bacillus thuringiensis* subsp. *israelensis* designed specifically for midge suppression. Field trials were conducted in man-made ponds on Hilton Head Island, SC. Applications were conducted with a Maruyama backpack blower at a rate of 26.8 lbs/acre. Efficacy was evaluated using Eckman dredge samples to evaluate larval populations pre and post-treatment and as compared to an untreated control pond. The primary nuisance species present was *Glyptotendipes paripes*. Larval surveillance indicated that the majority of the larval development was occurring around the banks of the test sites in firm, sandy substrates. As a result, larval sampling was conducted within a band of 10-20 feet from the banks of the treated and untreated ponds. Larval samples were washed on a USA Standard Testing Sieve No 50 (300 micrometers) to reduce the volume of the sample and facilitate accurate larval counts. Larval populations were reduced by an average of 95% during the first week post-treatment, 77% fourteen days post-treatment and 59% at twenty-one days post-treatment for the four trials conducted.

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#### VERTICAL DISTRIBUTION OF BITING FLIES IN BOREAL FORESTS OF SWEDEN

**Dustin A. Swanson**<sup>1</sup>, Peter H. Adler<sup>1</sup>, Björn Malmqvist<sup>2</sup>

<sup>1</sup>Dept. Entomology, Soils & Plant Sciences, Clemson University, Clemson, SC, USA

<sup>2</sup>Dept. Ecology and Environmental Science, Umeå University, Umeå, Sweden

How height influences the host-seeking behavior of hematophagous flies can be used to improve vector surveillance and provide ecological insights. The goal of this study was to map the vertical distribution of biting flies in two boreal forests of Sweden. Dry-ice baited Centers for Disease Control light traps were placed at 1.5, 5.0, and 10.0 m in a Scots pine forest and a spruce forest. Lightless traps were operated for 20-25 hr for 7 periods in June 2007. More than 40,000 hematophagous flies were collected, including 36,092 black flies, 606 biting midges, and 4,029 mosquitoes. Analysis of variance of the ranked data showed that the distribution of 3 taxa of black flies, 3 species of biting midges, and mosquitoes of the genus *Ochlerotatus* differed significantly with height. Seven taxa of black flies, 2 species of biting midges, and mosquitoes of the genus *Ochlerotatus* differed significantly between sites. Significant height-site interactions were found for three taxa of black flies and one species of biting midge. A majority (mean = 66.4%) of mammalophilic species were collected at 1.5m, and a majority (mean = 43.8%) of ornithophilic species were collected at 10.0 m. This study demonstrates that biting-fly species composition changes with height, emphasizing the importance of trap height in vector-surveillance and ecological studies.

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#### MOSQUITO AND BLACK FLY SURVEILLANCE METHODS, MAPS AND MORE

**Carey LaMere**, Metropolitan Mosquito Control District, St. Paul, MN

The Metropolitan Mosquito Control District (MMCD) conducts larval and adult mosquito surveillance to determine levels of mosquitoes present, measure annoyance, and to detect the presence of disease vector species. MMCD produces maps from surveillance data to help direct control measures effectively. The MMCD black fly program incorporated maps in 2007 and 2008 to help monitor black fly populations in the District.

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## LARVAL MORPHOLOGY OF *SIMULIUM BIVITTATUM*

**Kenneth Pruess**, University of Nebraska, Lincoln, NE

*Simulium bivittatum* has 8 larval instars based on measurement of postgenal length in 1200 larvae. This conclusion is supported by antennal, labral fan, mandible, and anal hook characters. Change in size of most characters closely follows Dyar's Law for instars 1-7 but with some departures between instars 7 and 8. Caution is required in using many of the examined characters for species discrimination unless last instar larvae are used and variation within that instar is known.

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## BLACK FLY PATHOGENS

**John McCreadie**<sup>1</sup> and Peter Adler<sup>2</sup>

<sup>1</sup>University of South Alabama, <sup>2</sup>Clemson University

*No abstract submitted*

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## THE INFLUENCE OF ANTHROPOGENIC DISTURBANCE ON TWO GROUPS OF LOTIC FILTER-FEEDING ORGANISMS, HYDROPSYCHIDAE AND SIMULIIDAE, IN THE SOUTHERN INNER PIEDMONT ECOREGION OF GEORGIA

**David Rouse**<sup>1</sup>, Jay Overmyer<sup>1</sup>, Aaron Fisk<sup>2</sup>, Duncan Hughes<sup>3</sup>

<sup>1</sup>University of Georgia, Department of Entomology, 413 Biological Sciences Building, Athens, GA 30602

<sup>2</sup>Great Lakes Institute for Environmental Research and Department of Earth and Environmental Sciences, University of Windsor, 401 Sunset Ave., Windsor, ON N9B 3P4

<sup>3</sup>Soque River Watershed Partnership, North Georgia Technical College, P.O. Box 65 Clarkesville, GA 30523

Disturbance plays an important role in influencing the abundance and distribution of lotic filter-feeding macroinvertebrates. Anthropogenic alteration of watersheds can increase disturbance in stream ecosystems through the alteration of natural hydrological regimes, physical degradation, reduced water quality, and the input of contaminants. Aquatic organisms are exposed to contaminants in various ways, but filter-feeding organisms are particularly vulnerable to hydrophobic contaminants through the ingestion of contaminant-bound suspended particles. In this study, ten streams were assessed to determine the effects of differing land uses on water quality and the subsequent impact on two groups of riffle-dwelling organisms, microfilterers (Simuliidae) and macrofilterers (Hydropsychidae). Sites were selected in an effort to capture the diversity of land uses present in the inner piedmont ecoregion of Georgia and were sampled quarterly for a year, quantitatively sampling riffle habitats. Agricultural land use appeared to increase nutrient levels and sedimentation, and urban land use had the strongest positive relationship with specific conductance, most likely reflecting  $\text{Ca}^{2+}$ ,  $\text{Cl}^-$ , and  $\text{Na}^+$  concentrations. Organic contaminants were detected in all of the streams. Data will be analyzed to determine the role of anthropogenic disturbance, particularly the impact of hydrophobic contaminants, on macrofilterers (Hydropsychidae) and microfilterers (Simuliidae) that share a common riffle habitat.

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REPRODUCTIVE PROTEOMICS

**Dathe Benissan-Messan**, Creighton University, Omaha, NE

*No abstract submitted*

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EMERGENCE PATTERNS OF *SIMULIUM JENNINGSI* IN HUNTERDON COUNTY, NEW JERSEY

**Tadhg Rainey**<sup>1</sup> and Scott Crans<sup>2</sup>

<sup>1</sup>Hunterdon County Department of Health, Flemington, NJ

<sup>2</sup>Rutgers University, New Brunswick, NJ

*No abstract submitted*

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MICROSATELLITE ANALYSIS OF THE *SIMULIUM ARCTICUM* SPECIES COMPLEX FROM MONTANA, USA

**Ida M. Conflitti**<sup>1</sup> and Douglas C. Currie<sup>1,2</sup>

<sup>1</sup>Department of Ecology & Evolutionary Biology, University of Toronto, Toronto, ON

<sup>2</sup>Department of Natural History, Royal Ontario Museum, Toronto, ON

Cytological analyses reveal that black fly morphospecies are often composites of chromosomally distinct populations. Whether these entities are considered reproductively isolated depends on their stage of chromosome evolution. In this study, we aim to understand the molecular basis of chromosomally induced speciation. Specifically, we will test whether cytologically defined taxa reflect underlying genetic structure. Larvae of the diverse *Simulium arcticum* species complex will be collected from the Rocky Mountains of Montana, USA, in the spring of 2009 and subsequently assigned to their respective cytospecies or cytotype designation. Genomic DNA from these larvae will be amplified and sequenced at eleven polymorphic microsatellite loci in order to: (1) genetically characterize members of the complex; (2) estimate pair-wise differentiation and gene flow between cytological taxa; (3) identify the number of genetic populations; and (4) understand how genetic data correlates with chromosomal divergence. In this way, genetic analyses of variable microsatellite loci can elucidate the evolutionary mechanism involved in the speciation of members of the *S. arcticum* complex and of black flies in general.

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COMPARISON OF LARVAL MORTALITY IN FIELD APPLICATIONS CONDUCTED AT LEGAL SUNSET AND MID-MORNING

**Elmer W. Gray**<sup>1</sup>, Robert A. Fusco<sup>2</sup> and Ray Noblet<sup>1</sup>

<sup>1</sup>University of Georgia, Department of Entomology, 413 Biological Sciences Building, Athens, GA 30602

<sup>2</sup>Valent BioSciences Corporation, 870 Technology Way, Libertyville, IL 60048

Field applications of Vectobac 12AS® (*Bacillus thuringiensis* var. *israelensis*) were evaluated to determine if mortality was effected when applications were conducted at

legal sunset as opposed to mid-morning. Six applications were conducted in the Chattahoochee River near Helen, Georgia. River flows were measured prior to each test and treatments were conducted at 1 ppm during a 1 minute application. All treatments were conducted via carboy with the prescribed volume of B.t.i. being diluted in 15 liters of river water and applied across the river. Larval samples were collected 2 hours post application, placed in 1 liter containers of river water, stored in a cooler with ice until returning to the laboratory. Samples were aerated with aquarium pumps and at approximately 24 hours post-treatment each sample was poured into a white enamel pan and percent mortality was determined. Average larval mortality for the sunset treatments was 69% as opposed to 61 % for the daytime treatments. Consequently, we see no negative aspect to conducting field applications until legal sunset when operational factors require such actions.

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#### BARBARIANS AT THE GATE: THE RESPONSE OF BLACK FLIES TO CLIMATE CHANGE IN NORTHERN NORTH AMERICA.

**Douglas C. Currie**, Department of Natural History, Royal Ontario Museum, Toronto, ON

The Arctic is among the most fragile ecosystems on Earth; it is also under immense environmental pressure as the effects of global warming are felt most acutely at northern latitudes. The Biological Survey of Canada plans to document changes in Canada's arthropod fauna by repeating the half-century-old Northern Insect Survey (NIS) — an unprecedented initiative that sampled diversity at 75 arctic and subarctic localities across northern North America. Plans for the new NIS will be presented, with special reference to biting flies. Preliminary results suggest that black flies can respond rapidly warming temperatures. The consequences of this phenomenon for northern birds and mammals are discussed.