FIFTY THIRD ANNUAL REPORT

OF THE

STATE MOSQUITO CONTROL COMMISSION

OF THE

STATE OF NEW JERSEY

For the Fiscal Year commencing July 1, 2008 and ending June 30, 2009

FIFTY THIRD ANNUAL REPORT

NEW JERSEY STATE MOSQUITO CONTROL COMMISSION

2009

STATE OF NEW JERSEY
JON S. CORZINE, GOVERNOR

N.J. DEPARTMENT OF ENVIRONMENTAL PROTECTION
MARK N. MAURIELLO, ACTING COMMISSIONER

Report prepared by the Office of
Mosquito Control Coordination,
N.J. Department of Environmental Protection
Robert Kent, Administrator
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State of New Jersey

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CHRIS CHRISTIE
Govenor

KIM GUADAGNO
Lt. Govenor

BOB MARTIN
Commissioner

To: The Honorable Chris Christie, Governor
The Honorable Kim Guadagno, Lt. Governor
and members of the Senate and the
General Assembly of the State of New Jersey

In accordance with the provisions of Title 26 Chapter 9:12.6, we are pleased to submit the Fifty Third Annual Report of the State Mosquito Control Commission for the Fiscal Year covering the period from July 1, 2008 through June 30, 2009

Respectfully,

John Sarnas, M.A., H.O., Chairman
Daniel Konczyk, Vice Chairman
Kenneth Bruder, Ph.D.
John Surmay, R.Ph., H.O.
Howard Emersom, H.O.
George Van Orden, Ph.D., H.O.
Mark Robson, Ph.D., M.P.H.
Anthony Petrongolo, M.S.
Shereen Semple, M.S.
Mark Mayer, M.S.

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MEMBERS OF THE STATE MOSQUITO CONTROL COMMISSION

John Sarnas, M.A., H.O. Chairman	Hudson County
Daniel Konczyk, Vice Chairman	Cape May County
Kenneth Bruder, Ph.D.	Ocean County
John Surmay, R.Ph., H.O.	Union County
Mark Robson, Ph.D., M.P.H. Ex Officio	N.J. Agricultural Experiment Station Rutgers University
Heather Howard, Commissioner Ex Officio	N.J. Department of Health & Senior Services
Douglas Fisher, Secretary Ex Officio	N.J. Department of Agriculture
Mark Mauriello, Acting Commissioner Ex Officio	N.J. Department of Environmental Protection
Robert Kent, Secretary	N.J. Department of Environmental Protection

The following individuals served as representatives for the various ex officio members during the year:

Shereen Semple, M.S.	N.J. Department of Health & Senior Services
Anthony Petrongolo, M.S.	N.J. Department of Environmental Protection
Mark Mayer, M.S.	N.J. Department of Agriculture

COMMISSION ACTIVITIES AND HIGHLIGHTS DURING FISCAL YEAR 2009

During the fiscal year 2008-2009, the State Mosquito Control Commission continued to monitor and address those issues, activities and legislation of importance to the mosquito control interests in New Jersey. Official meetings of the New Jersey State Mosquito Control Commission were held monthly during the year on the following dates and at the following locations:

DATE	LOCATION
July 15, 2008	Office of Mosquito Control Coordination, DEP, Trenton, N.J.
August 19, 2008	Office of Mosquito Control Coordination, DEP, Trenton, N.J.
September 16, 2008	Office of Mosquito Control Coordination, DEP, Trenton, N.J.
October 21, 2008	Canceled
November 18, 2008	Canceled
December 16, 2008	Office of Mosquito Control Coordination, DEP, Trenton, N.J.
January 20, 2009	Office of Mosquito Control Coordination, DEP, Trenton, N.J.
February 17, 2009	Office of Mosquito Control Coordination, DEP, Trenton, N.J.
March 17, 2009	Office of Mosquito Control Coordination, DEP, Trenton, N.J.
April 21, 2009	Office of Mosquito Control Coordination, DEP, Trenton, N.J.
May 19, 2009	Office of Mosquito Control Coordination, DEP, Trenton, N.J.
June 16, 2009	Office of Mosquito Control Coordination, DEP, Trenton, N.J.

In addition to the regularly scheduled meetings, the commissioners participated in numerous committee meetings and conferences with local, state and federal officials regarding mosquito control related matters. All business meetings were announced and held in compliance with the Open Public Meeting Law. P.L. 1975. C231.

State Equipment Use Program

The State Mosquito Control Commission has in its inventory 127 pieces of equipment available to the mosquito control community as part of its Equipment Use Program (Table 1). This program assigns research, surveillance, or operational control equipment to the requesting mosquito control agencies on an as-needed basis. The equipment is used and maintained under the Department of Environmental Protection's Equipment Use Agreement and the State Mosquito Control Commission's "Guidelines for the Use and Repair of State-Owned Equipment". During fiscal year 2009, twenty of the twenty-one county mosquito control agencies, as well as the New Jersey Agricultural Experiment Station at Rutgers University and the New Jersey Department of Environmental Protection's Division of Fish and Wildlife utilized this equipment.

The Commission took delivery of one new piece of equipment in fiscal year 2009, a 14,000 lb. tilt bed trailer to transport the Marsh Master II. The $7,495.00 to purchase this trailer had been encumbered in fiscal year 2008, but delays in the manufacture of the trailer resulted in a fiscal year 2009 delivery date. The Marsh Master II, an amphibious, tracked vehicle equipped with a mower attachment, was delivered in fiscal year 2008. Several partners were involved in the purchase of this piece of equipment, including the State Mosquito Control Commission, the New Jersey Department of Environmental Protection Office of Engineering and Construction, the United States Fish and Wildlife Service, and the National Fish and Wildlife Foundation, through a grant administered by Ducks Unlimited. The Marsh Master is used by the county mosquito control agencies and the purchasing partners to mow *Phragmites*. Additionally, $160.00 was expended in fiscal year 2009 to purchase a remote control for the tilt bed on the trailer.

A hydraulic thumb attachment was purchased at a cost of $14,331.77 to augment SMCC # 8, the long reach hydraulic excavator assigned to the Salem County Mosquito Commission. The thumb attachment will enable the bucket on this excavator to perform as a jaw bucket. This upgrade was made for environmental reasons, in order to make this machine more sensitive to better follow Department of Environmental Protection Land Use Program regulations. Retrofitting the existing bucket with the hydraulic thumb attachment was much less costly than purchasing a new jaw bucket would have been.

SMCC # 6, the low ground pressure hydraulic excavator assigned to the Warren County Mosquito Commission was augmented with a Powertilt PT-07 at a cost of $8,725.35. This device allows the pitch of the excavator bucket to be adjusted from right to left, which allows the bucket to remain parallel to the project grade regardless of the position of the excavator. This is of great benefit when the machine is operated on slopes.

A track kit was purchased for SMCC # 14, an all-terrain vehicle assigned to the Ocean County Mosquito Commission. The purchase price of the track kit was $2,979.00; the tracks will enable this vehicle to negotiate salt marsh terrain with greater ease and safety. Three pieces of state-owned equipment required repairs during the course of the fiscal year, at a total cost to the Commission of $6,416.36. This included $4,000.00 for repairs to SMCC # 55, the hydraulic excavator assigned to the Essex County Division of Mosquito Control. $1,340.00 was expended for repairs to SMCC # 42, the flatbed truck assigned to the Sussex County Office of Mosquito Control. SMCC # 12, the low ground pressure hydraulic excavator assigned to the Cumberland County Division of Mosquito Control, was repaired at a cost of $1,076.36.

Five pieces of equipment in the Commission's inventory were transferred during the course of the fiscal year. The Salem County Mosquito Commission surrendered SMCC # 29, a ULV machine which was subsequently requested by and transferred to the Cumberland County Division of Mosquito Control. The Essex County Division of Mosquito Control surrendered SMCC # 90, 91, and 92, a 17-foot boat, outboard motor, and trailer. This equipment was then transferred to the Ocean County Mosquito Commission. Last, SMCC # 26, the Curtis Dyna-Jet L30 ULV machine equipped with a Dyna-Trax GPS spray recording and vehicle monitoring system that had been purchased in fiscal year 2008 and kept in inventory as a replacement sprayer, was requested by and transferred to the Passaic County Mosquito Control Division.

Table 1. State Mosquito Control Commission

No.	Type of Equipment	Location
1	1992 Amphibious Hydraulic Rotary Excavator	Cape May
2	1987 Amphibious Hydraulic Rotary Excavator	Ocean
3	1995 Amphibious Hydraulic Rotary Excavator	Atlantic
4	2007 Amphibious Tracked Vehicle	State
5	2003 Long-Reach Hydraulic Excavator	Essex/Morris
6	2003 Low Ground Pressure Hydraulic Excavator	Warren
7	2003 Low Ground Pressure Hydraulic Excavator	Salem
8	1992 Long-Reach Hydraulic Excavator	Salem
9		Vacant
10	1995 Amphibious Hydraulic Excavator	Salem
11	1986 Hydraulic Excavator	Div. Fish & Wildlife
12	2003 Low Ground Pressure Hydraulic Excavator	Cumberland
13	2002 Hydraulic Excavator	Atlantic
14	2002 All-Terrain Vehicle	Ocean
15	2002 All Terrain Vehicle Trailer	Ocean
16	1983 Tracked Vehicle	Essex
17	1985 Widetrack Bulldozer/Backhoe	Salem
18	1972 17 Foot Boat	Atlantic
19	2002 Outboard Motor	Atlantic
20	2002 Boat Trailer	Atlantic
21	1988 13 Foot Boat	Burlington
22	1988 Boat Trailer	Burlington
23	2002 Outboard Motor	Burlington

24	1988 Stereo Microscope w/optics	Warren
25	2008 U.L.V. Machine	Warren
25	2008 G.P.S. Reporting/Monitoring System	Warren
26	2008 U.L.V. Machine	Passaic
26	2008 G.P.S. Reporting/Monitoring System	Passaic
27	1994 Ultra Low Temperature Freezer	Rutgers
28	1995 U.L.V. Machine	Salem
28	2007 Variable Flow Control	Salem
29	1995 U.L.V. Machine	Cumberland
30	1995 U.L.V. Machine	Sussex
30	2006 Spray Recording/Vehicle Monitoring System	Sussex
31	2003 Stereo Microscope w/optics	Mercer
32	1995 Turbine Sprayer	Cumberland
33	1995 U.L.V. Machine	Gloucester
34	1981 Phase-Contrast Microscope	Hudson
34	1981 Power Pak	Hudson
34	1981 Camera	Hudson
35		Vacant
36	2004 Incubator	Rutgers
37	1987 Stereo Microscope w/optics	Camden
38	1987 Stereo Microscope w/optics	Hudson
39	1992 U.L.V. Machine	Cumberland
40		Vacant
41	1988 Biosafety Cabinet	Rutgers
42	1977 Flatbed Truck	Sussex
43	2002 2WD Pickup Truck w/Cap	Morris
44	1987 20-Ton Trailer	Salem
45	1976 Compound Microscope	State
46	1977 Compound Microscope	Rutgers
47	1977 Stereo Microscope	Rutgers
48	1977 Stereo Microscope	Rutgers
49	1980 Bulldozer/Backhoe	Warren
50	1980 Rotary Ditcher Attachment	Salem
51	2005 Tabletop Autoclave	Hunterdon
52	1984 Stereo Microscope	Monmouth
53		Vacant
54	2002 4x4 Pickup Truck w/Cap	State
55	1985 Hydraulic Excavator	Essex
56	1988 6" Water Pump	Cape May
57	1989 Stereo Microscope	Atlantic
58	1989 Tracked Vehicle	Salem
59	1989 All Terrain Vehicle Trailer	Salem
60	1990 Stereo Microscope w/optics	Sussex
61	1990 20-Ton Trailer	Warren

62	1996 All-Terrain Vehicle	Monmouth
63	1996 All-Terrain Vehicle Trailer	Monmouth
64	1997 Turbine Sprayer	Gloucester
65	1997 17 Foot Boat	Ocean
66	2007 Outboard Motor	Ocean
67	1998 Boat Trailer	Ocean
68	2000 Stereo Microscope	Hunterdon
69	2007 U.L.V. Machine	Hunterdon
69	2007 G.P.S. Monitoring/Reporting System	Hunterdon
70	2007 U.L.V. Machine	Burlington
70	2007 G.P.S. Monitoring/Reporting System	Burlington
71	2007 U.L.V. Machine	Essex
71	2007 Monitoring/Reporting System	Essex
72		Vacant
73	2007 U.L.V. Machine	Atlantic
73	2007 Monitoring/Reporting System	Atlantic
74	2007 U.L.V. Machine	Hunterdon
74	2007 Monitoring/Reporting System	Hunterdon
75	2000 U.L.V. Machine	Gloucester
76	2001 Power Sprayer	Hunterdon
77	2000 U.L.V. Machine	Salem
78	2001 Ultra Low Temperature Freezer	Bergen
79	2001 Ultra Low Temperature Freezer	Middlesex
80	2001 Ultra Low Temperature Freezer	Monmouth
81	2001 Ultra Low Temperature Freezer	Morris
82	2001 Ultra Low Temperature Freezer	Salem
83	2001 Ultra Low Temperature Freezer	Warren
84	2001 Ultra Low Temperature Freezer	Camden
85	2001 Ultra Low Temperature Freezer	Sussex
86	2001 U.L.V. Machine	Sussex
86	2006 Spray Recording/Vehicle Monitoring System	Sussex
87	2001 Insecticide Applicator	Sussex
88	2004 Power Sprayer	Essex
89	2001 4x4 Pickup Truck w/Cap	Atlantic
90	2002 17 Foot Boat	Ocean
91	2002 Outboard Motor	Ocean
92	2002 Boat Trailer	Ocean
93	2002 All-Terrain Vehicle	Camden
94	2002 All Terrain Vehicle Trailer	Camden
95	2002 All-Terrain Vehicle	Essex
96	2002 All-Terrain Vehicle	Hunterdon
97	2002 All Terrain Vehicle Trailer	Hunterdon
98	2002 4x4 Pickup Truck	State
99	2002 All-Terrain Vehicle	Sussex

100	2002 All Terrain Vehicle Trailer	Sussex
101	2002 Acoustic Storm Drain System	Sussex
102	2002 Ultra Low Temperature Freezer	Rutgers
103	2002 All-Terrain Vehicle	Bergen
104	2002 All Terrain Vehicle Trailer	Bergen
105	2002 U.L.V. Machine	Salem
106	2002 Ultra Low Temperature Freezer	Burlington
107	2002 Ultra Low Temperature Freezer	Mercer
108	2002 U.L.V. Machine	Cumberland
109	2002 U.L.V. Machine	Essex
110	2002 All-Terrain Vehicle	Union
111	2003 All Terrain Vehicle Trailer	Union
112	2003 Microplate Reader	Rutgers
113	2003 Microplate Washer	Rutgers
114	2003 All-Terrain Vehicle	Mercer
115	2003 All Terrain Vehicle Trailer	Mercer
116	2002 All-Terrain Vehicle	Ocean
117	2003 All-Terrain Vehicle Trailer	Ocean
118	2003 All-Terrain Vehicle	Cumberland
119	2004 All-Terrain Vehicle Trailer	Cumberland
120	2003 All-Terrain Vehicle	Hudson
121	2004 All-Terrain Vehicle Trailer	Hudson
122	2004 Ultra Low Temperature Freezer	Gloucester
123	2004 Ultra Low Temperature Freezer	Essex
124	2004 Ultra Low Temperature Freezer	Passaic
125	2004 Ultra Low Temperature Freezer	Cumberland
126	2004 Ultra Low Temperature Freezer	Union
127	2004 Ultra Low Temperature Freezer	Hudson
128	2008 Turbine Sprayer	Hudson
129	2007 Turbine Sprayer Trailer	Hudson
130	2009 Amphibious Tracked Vehicle Trailer	State

Program Director: Claudia O'Malley, Office of Mosquito Control Coordination
N.J. Department of Environmental Protection

State Mosquito Airspray Program

Fiscal year 2009 began as in past years with the mosquito control season well underway. Climatic conditions were not quite as dry as had been the case in past fiscal years. Operationally, the Airspray Program performed 29 insecticide applications in 6 counties, treating a total of 31,520 acres (Table 2). The program's primary focus continues to be the control of mosquitoes in the larval stage of development, in order to reduce the need to perform applications for adult mosquito control. For the third fiscal year in succession, no aerial adulticide operations were performed. The majority of the aerial larvicide applications (72%) were made to the Atlantic coastal salt marshes and Delaware Bayshore salt hay farms, where mosquito production is predominantly influenced by monthly tidal cycles. The remaining 28% of larvicide operations were performed on upland targets.

The insecticides used in these larvicide applications were temephos (5% granular formulation), and both granular and aqueous suspension formulations of *Bacillus thuringiensis* var. *israelensis* (Bti). Bti continues to provide good control of larval salt marsh mosquito populations within the Atlantic coastal salt marshes and the salt hay farms along the Delaware Bay.

In addition to aerial larviciding, program aircraft were also utilized for the surveillance of mosquito production habitats in Cape May and Cumberland counties. As an example of the State Mosquito Control Commission's continued policy of interagency cooperation and concern for ecology and the environment, program aircraft, in the form of a Bell 206B Jet Ranger, were provided to personnel from the Division of Fish and Wildlife's Endangered and Nongame Species Program on October 22, 2008. This enabled them to conduct bald eagle surveillance in the southern portion of the state.

Aircraft available to the program included a single-engine, Air Tractor AT-602 and single-engine Grumman Ag Cats for high payload applications, Cessna Skylanes for observation and survey work, and Bell Jet Ranger rotary-wing aircraft for both insecticide applications and survey work.

Since fiscal year 1996, state aid has been provided to those counties that make insecticide applications for mosquito control to state-owned land within their corporate borders. This aid is made in the form of in-kind replacement of the insecticides applied. Ocean County was reimbursed with 1,584 gallons of Vectobac 12AS for applications made to state-owned land during fiscal year 2009.

Table 2. State Airspray Program acreage treated in FY2009 by mode and county.

County	Larviciding Acreage	Adulticiding Acreage	Total Acreage
Atlantic	13,359	- 0 -	13,359
Cape May	1,075	- 0 -	1,075
Cumberland	7,634	- 0 -	7,634
Essex	5,132	- 0 -	5,132
Hudson	620	- 0 -	620
Morris	3,700	- 0 -	3,700
State Total	**31,520**	**- 0 -**	**31,520**

Program Director: Claudia O'Malley, Office of Mosquito Control Coordination
N.J. Department of Environmental Protection

Biological Control Program

In keeping with its integrated pest management approach to mosquito control, the State Mosquito Control Commission continued to support the Biological Control Program during fiscal year 2009. This program was begun in fiscal year 1992 and has played an important role as one of the Commission's state aid programs to county mosquito control agencies.

The Commission renewed its longstanding Memorandum of Agreement with the New Jersey Division of Fish and Wildlife for developing, maintaining, and providing fishery stocks at the Charles O. Hayford Fish Hatchery at Hackettstown. Bureau of Freshwater Fisheries personnel again raised stocks of fish for release into known mosquito production sites throughout New Jersey. However, the problems with overwintering *Gambusia affinis* experienced during the past several years were once again in evidence. The cause of *Gambusia* mortality is still a mystery, and reductions in staff levels at the Charles O. Hayford Hatchery have resulted in the continued inability to resolve this problem.

These difficulties notwithstanding, the Bureau of Freshwater Fisheries continues to provide outstanding assistance to the Office of Mosquito Control Coordination and the participating county mosquito control agencies. All stocking is performed strictly in accordance with the guidelines and policy outlined in the DEP document "How to Use the State Bio-Control (Mosquitofish) Program for Mosquito Control in New Jersey". A total of 102,773 fish were stocked through the Biological Control Program in fiscal year 2009, in seven New Jersey counties (Table 3). Additionally, staff of the Center for Vector Biology at Rutgers University obtained fish for use in a public relations program associated with that institution's Asian Tiger Mosquito control project. Species of fish stocked included the Mosquitofish, *Gambusia affinis*, and the Fathead Minnow, *Pimephales promelas*. A total of 2,769,375 fish have been provided at no cost to the counties for mosquito control purposes through the Commission's Biological Control Program since its inception in 1992.

SMCC # 11, the 1986 Koehring hydraulic excavator which has been assigned to the Division of Fish and Wildlife since fiscal year 2006, was again used on pond maintenance projects at the Hatchery.

The cyclopoid copepod project, which was begun in fiscal year 2005, continued in fiscal year 2009. The Commission renewed its Memorandum of Agreement with the New Jersey Department of Agriculture's Phillip Alampi Beneficial Insect Laboratory. Staff there has been culturing the native New Jersey copepod *Macrocyclops albidus* for release in select mosquito larval habitats. During the winter of 2007 the copepod population under culture experienced an inexplicable die-off. Beneficial Insect Lab personnel, through hard work and perseverance, were able to re-establish colonies of *Macrocyclops albidus* in sufficient numbers for release in May, 2009. Mosquito control agencies participating in the project in fiscal year 2009 included those in Cape May, Cumberland, Hunterdon, Monmouth, Morris and Sussex counties. Ornamental ponds, "contrived" woodland pools, pits, and natural woodland pools were among the sites under investigation.

Program Director: Claudia O'Malley, Office of Mosquito Control Coordination
N.J. Department of Environmental Protection

Table 3. Mosquitofish stocking by county and species during FY 2009.

County	Species	Number of Fish
Bergen County	Fathead minnows	10,200
	Gambusia	1,000
Essex County	Fathead minnows	8,964
Gloucester County	Fathead minnows	3,429
Ocean County	Fathead minnows	20,500
Rutgers University	Gambusia	100
Sussex County	Fathead minnows	23,080
Union County	Fathead minnows	5,500
Warren County	Fathead minnows	30,000
Total		**102,773**

Monitoring the Efficacy of Insecticides for Mosquito Control in New Jersey

To perform efficacy testing on the toxicity of insecticides used for mosquito control you will need to collect field samples of *Ae. sollicitans* female mosquitoes to serve as the parental generation. These mosquitoes are placed in cages and fed a bloodmeal so as to allow the eggs to develop properly. A short time after this bloodmeal the female mosquitoes will deposit eggs which are collected and will become the F1 generation mosquito larvae that will be used to perform this efficacy testing. This report includes the current toxicity data on Bti, spinosad, temephos and methoprene derived through this efficacy testing of the F1 larvae reared from the *Ae. sollicitans* females field collected from the subject counties between July and October of 2008.

Host-seeking *Ae. sollicitans* females were collected in four locations in New Jersey: West Creek in Ocean County, Leed's Point in Atlantic County, Sutton Lane in Cape May County, and East Point Lighthouse in Cumberland County. Due to the considerable uncertainty about the continuation of this project, we only began collecting mosquitoes on July 7, 2008. We made ten trips visiting all four field sites on each occasion with our last collecting trip for the season on October 20, 2008. Despite our late start, we were able to secure a sufficient number of female mosquitoes.

The female mosquitoes were brought back to the Headlee lab in New Brunswick and fed cattle blood, purchased from the Carteret Abattoir, with a Hemotek apparatus. After 4 feedings, the mosquitoes were transferred to glass shell vials (2 females per vial) with a moistened cotton ball and sealed with a piece of fabric screen (bridal tulle) through which they could drink a 10% sugar solution placed on top in a saturated paper towel. After they had laid eggs and died, each female was identified by microscopic inspection. Vials with dead females that were not *Ae sollicitans* were discarded. The egg-containing shell vials were stored in plastic baskets with a wet paper towel on top and wrapped in a plastic bag. The baskets were stored at $24^{\circ}C +/- 2^{\circ}C$ in a Percival environmental incubator set at a 16/8 day/night cycle, and the moisture level of the cotton was monitored and adjusted weekly. The numbers of vials, each containing 2 females and the numbers of vials with eggs from each field site are shown in Table 4.

Table 4. Summary of female Ae. sollicitans wild-caught at each field site in 2008.

County	Total number of vials	Total number of vials with eggs
Ocean	757	406
Atlantic	358	190
Cape May	906	495
Cumberland	277	168

Inefficient as this method may seem, it is, nevertheless, the most productive way to secure a sufficient number of mosquito larvae to work with. There is also a highly variable number of eggs in each vial ranging from fewer than 10 to well over 100. In addition, not every egg hatches out a larva. There are variations in each step of this series of events. We have submitted a manuscript (in review) that describes our procedure to acquire mosquito larvae.

Obtaining the mosquito larvae.

The eggs were allowed to dry for at least three weeks, and as needed, hatching was accomplished by adding pure fresh water to the vial and depleting the dissolved oxygen by applying a brief vacuum. This also improved synchronized hatching. The larvae were placed in white plastic trays and raised on ground rat chow (Purina) in fresh water at 24° C and the water was kept clean by toweling the surface each day before feeding. Only uniformly sized 4th instar larvae were selected for the experiments.

Discriminating dose assays with temephos and methoprene.

Analytical grade, >99% pure, temephos and methoprene were purchased from Chem Service, West Chester, PA. The methoprene used was a racemic mixture of the R and S forms, containing mostly the S (bioactive) form. Test solutions were prepared by dissolving the insecticide in analytical grade acetone and serially diluting the stock solution with acetone. For temephos, sets of 250-mL Pyrex glass beakers with 100 mL of pure, fresh water, 10 mosquito larvae, and μL quantities of a temephos in acetone solution were used in 6 – 8 replicates (Figure 1). Temephos toxicity (dead larvae) was assessed 24 hours after application.

Figure 1. General experimental setup for in vivo laboratory insecticide toxicity bioassays.

The methoprene toxicity test was done according to A. Ali, J.K. Nayar and R.D. Xue, 1995 (Comparative toxicity of selected larvicides and insect growth regulators to a Florida laboratory population of *Aedes albopictus*, J. Amer. Mos. Cont. Assoc., 11:72-76.) Each experiment consisted of 6 – 10 replicates of assays in 250 mL glass beakers inside plastic mosquito breeding cages. Each beaker contained 100 mL of pure fresh water, 10 early (newly molted) 4th instar mosquito larvae, and a small pinch of ground rat chow. The test beakers also contained one dose of methoprene dissolved in 10 µL of acetone. When all larvae in the control beaker had emerged as adults, or after 10 days, the experiment was terminated and adults emerged in all experimental beakers were counted. The results of the test are described as the inverse of the number of eclosing adults, both males and females, i.e., cumulative mortality over the 10-day experimental period.

Doses of temephos and methoprene to be tested were based on previous toxicity data obtained with larvae from mosquitoes collected in 2007. A dose expected to produce 80 – 90 percent mortality was used. (R. T. Roush & G. L. Miller, 1986. Considerations for design of insecticide resistance monitoring programs. J. Econ. Entomol., 79:293-298.) The treated mosquito larvae were incubated at 24° - 26°C under loosely fitted aluminum foil in a Percival bench-top environmental incubator. The mortalities obtained with these doses in 2008 are shown in Table 5.

Table 5. Discriminating dose toxicity data for methoprene and temephos to 4th instar larvae of *Ae. sollicitans* from Ocean, Atlantic, Cape May, and Cumberland Counties treated with an expected LC_{80-90} dose of insecticide. (N = number of assays)

2008	Methoprene (ppb) (10-day)			Temephos (ppb) (24-hour)		
County	Dose (ppb)	Percent mortality	N	Dose (ppb)	Percent mortality	N
Ocean	15	88	12	10	97	10
Atlantic	15	90	6	10	94	12
Cape May	15	94	9	8	95	12
Cumberland	15	90	6	19	94	12

Compared to data from previous years, the toxicity of temephos to Ocean County and Atlantic County larvae was higher to the 2008 larvae and about the same to Cape May and Cumberland County larvae. The LC_{90} values for temephos to larvae from 2007 were approximately 20, 19, 10, and 15 ppb to larvae from Ocean, Atlantic, Cape May, and Cumberland counties, respectively. The methoprene toxicity was higher than in previous years; the LC_{90} values for methoprene ranged from 30 to 150 ppb to larvae from females collected in 2007.

Complete LC_{50} assays

Complete LC_{50} assays with a range of concentrations of the insecticide were done with Bti and spinosad (experimental formulation GF-1592).The Bti preparation was a sample of VectoBac containing 11.61% active ingredient representing 1200 international toxic units per mg. (there is no direct relationship between potency and the percent active ingredient by weight - 11.61). It is unclear exactly what the 'active ingredient' really is. The toxic principle of Bti is a large, 144 kD protein that is clearly not the item quantified in this formulation. A sample of the formulation was weighed and appropriately diluted with distilled water to produce a series of solutions giving a range of concentrations from 10 – 100 ppb of whatever the active ingredient is. The treated mosquito larvae were incubated at 24° - 26°C under loosely fitted aluminum foil in a Percival bench-top environmental incubator. The LC_{50} data were generated with the PoloPlus program (LeOra Software 2002 – 2008). The toxicity data for Bti are presented in Table 6.

Table 6. Mortalities of 4th instar larvae of *Ae. sollicitans* in 2008 and 2007 (95% lower - upper confidence limits of the LC_{50} value) 24 hours after treatment with Bti.

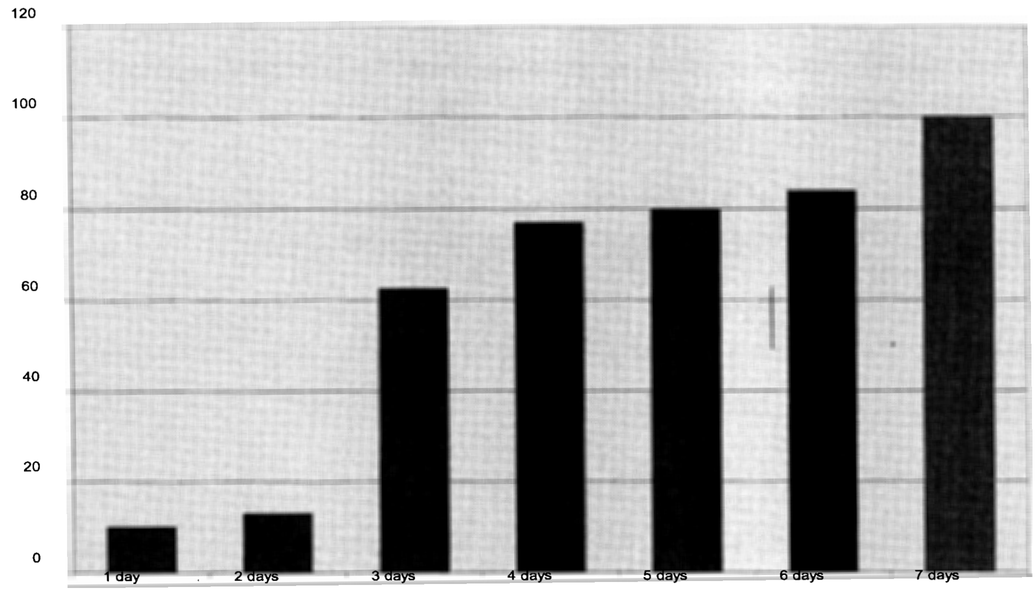
County	LC_{50} (ppb) 2008	LC_{50} (ppb) 2007
Ocean	21.6 (18.2 –25.2)	45.8 (39.3 – 54.6)
Atlantic	21.6 (18.9 –24.9)	-
Cape May	16.8 (14.8 – 19.1)	32.6 (27.2 – 39.2)
Cumberland	24.2 (21.7 – 27.4)	-

Toxicities of Bti were obtained for 2007 mosquito larvae only for the two counties Ocean and Cape May as shown in Table 6. The mortalities from Bti of 2008 mosquito larvae were about half of the mortalities in 2007 larvae. Or, conversely, the toxicity of Bti was higher in 2008 than in 2007. Several more years of LC_{50} data should reveal a consistent pattern, indicating a range of mortalities/toxicities that can be considered within normal random variation. Although every attempt is made to control consistent assay conditions in the laboratory assay procedures, small differences (a minor difference in the amount of food supplied in each beaker, or a new vs. an old environmental incubator light source) can produce differences in the measured toxicities. There will also always be variations in the live assay material.

Spinosad (a mixture of spinosyn A and spinosyn D dissolved at 20.6% in methyl salicylate (wintergreen oil)) was tested in an experimental formulation, GF-1592. A stock solution of 1 mg. spinosad per mL of acetone was made based on the 20.6% content in the sample. This stock solution was diluted several times with acetone so that 10 – 20 µL of the solution could be added to 250mL glass beakers containing 100 mL of water and 10 early fourth or late third instar mosquito larvae, providing doses in the low ppb range. The larvae were provided with a tiny pinch of food (ground Purina rat chow) and incubated under loosely fitted aluminum foil in an environmentally controlled chamber set at 16/8 hours of light/dark and 24°-26°C. Mortality was tallied every 24 hours and assessed after 3 days based on the progressive mortality observed and described below. Spinosad appears to result in mortality at a comparatively swift rate, typical for compounds that affect the nervous systems. It is possible that, in a field situation, an organism gets sufficiently deranged early on to fall easy prey. It proved impossible to accurately assess mortality after 24 hours of incubation. There were many half-dead larvae but few that were obviously completely dead. The picture became a little clearer after 48 hours of incubation and a reproducible result of mortality attributable solely to spinosad could be obtained after 3 days (72 hours) of incubation.

A dose of 5 ppb killed fourth instar larvae as shown in Figure 2.

24 hours	<10%	3 days	63%	5 days	80%	7 days	100%
48 hours	13%	4 days	77%	6 days	84%		



The 3-day mortality from spinosad treatment is shown in Table 7. This is the first in-vivo toxicity study against *Ae. sollicitans* or any other mosquito in New Jersey using spinosad.

Table 7. Mortality 3 days after treatment with spinosad in *Ae.sollicitans* larvae.

County	**LC_{50} (ppb) 2008**
Ocean	2.4 (2.1 - 2.6)
Atlantic	1.5 (1.3 - 1.7)
Cape May	1.4 (1.2 - 1.7)
Cumberland	1.7 (1.3 - 2.2)

There is no other spinosad toxicity studies against *Ae sollicitans* to which these may be compared. Data with other mosquito species indicate that the spinosyns are toxic also to larvae of other mosquito species. In a 2005 paper, Darriet et al. (F. Darriet, S. Duchon, J. M. Hougard, 2005, Spinosad: a new larvicide against insecticide-resistant mosquito larvae, JAMCA, 21:495-496) report 24-hour LC_{50} values to "susceptible" strains of *Ae. aegypti, Anopheles gambiae*, and *Culex quinquefasciatus* of 350, 10, and 93 ppb, respectively, considerably higher doses than our data with *Ae. sollicitans*. In another study (J. G. Bond, C. F. Marina, T. Williams, 2004, The naturally derived insecticide spinosad is highly toxic to *Aedes and Anopheles* mosquito larvae, Med. Vet. Entomol., 18:50-56), 24-hour, LC_{50} values to *Ae. aegypti* and *An. albimanus* larvae were indicated as 25 and 24 ppb respectively, after a 1-hour exposure followed by incubation in clean water. Variations in bioassay methods could contribute to these differences.

Project Director: Lena Brattston, Ph.D. Rutgers University

Surveillance for the Mosquito Vectors of Eastern Equine Encephalitis and West Nile Virus in New Jersey

Introduction

The New Jersey State Mosquito Control Commission (SMCC) has monitored potential vectors of mosquito-borne encephalitis in New Jersey since 1975 with a vector surveillance program designed to keep health related agencies aware of the potential for human involvement. Eastern Equine encephalitis (EEE) was an original target for investigation because of its impact on coastal resorts in the southern portion of the state. West Nile virus (WNV) was added to the program in 2000 following an outbreak in New York City the previous year. County mosquito control personnel were recruited to collect and process specimens. This program functions as a cooperative effort that includes the N.J. Department of Environmental Protection, the N..J. Department of Health and Senior Services, the N.J. Agricultural Experiment Station at Rutgers and the 21 county mosquito control agencies in the state. The goal is a disease surveillance effort that provides mosquito control agencies with information to target vector populations for the prevention of human disease. This report documents the results of virus surveillance efforts during the 2008 encephalitis season.

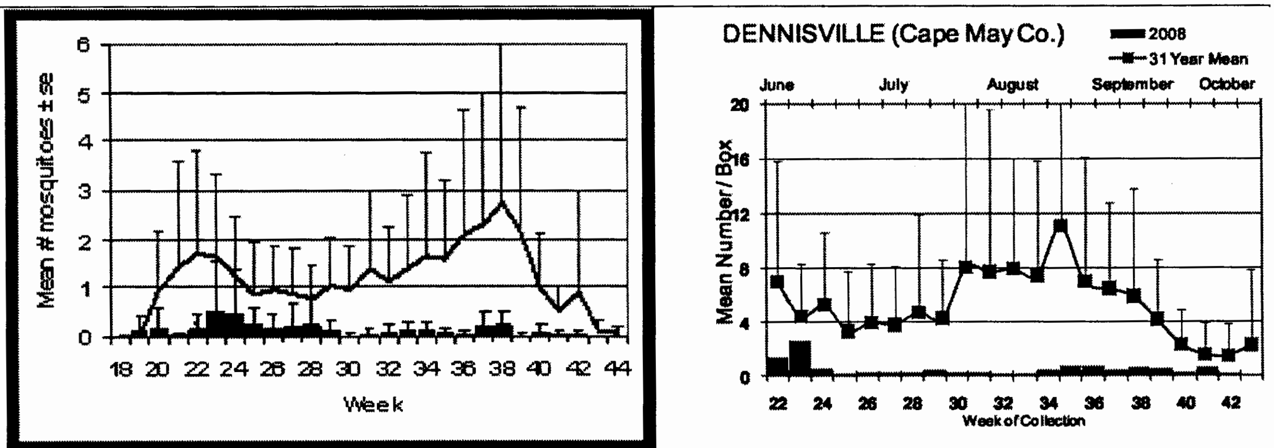
Methodology of EEE Surveillance

The mosquito, *Culiseta melanura,* is monitored from late May to mid-October as the primary indicator of EEE virus in southern New Jersey. This ornithophilic mosquito usually does not bite mammals but can be used to monitor virus levels in local bird populations as the season progresses. Weekly collections of *Cs. melanura* were made from resting boxes at permanent study sites by a team of field staff from Rutgers. The mosquitoes were frozen on dry ice at the collection site and transported to Headlee Research Labs at Rutgers for further processing. The frozen specimens were sorted on a chill table to maintain the cold chain and were identified to species, pooled by stage of blood meal digestion and submitted weekly to the Public Health & Environmental Lab facility in Trenton for virus testing. Positive pools were detected by Taqman RT-PCR. Information from the investigation was summarized and distributed weekly to mosquito control and public health agencies in New Jersey and the Northeast. The resting box collection sites for 2008 included: Turkey Swamp in Monmouth County, Green Bank in Burlington County, Corbin City in Atlantic County, Dennisville in Cape May County, Waterford in Camden County and Centerton in Salem County A new site near Glassboro in Gloucester County was added this year.

Results of EEE Surveillance in 2007

During the previous year, *Culiseta melanura* population levels rose to significant levels prior to and at the beginning of the surveillance season but did not maintain these levels throughout the season. The 2008 mosquito season began with low levels of *Culiseta melanura* in both the Statewide Surveillance light traps of the Pinelands and resting box populations in the Vector Surveillance program (Figure 3). Populations sampled from both types of traps maintained low levels throughout the season with amplification occurring with the second generation should set the stage for horse and human cases, which usually develops during from August to November. In 2006, virus was detected at only one site and appeared to be poorly disseminated in southern New Jersey. EEE was detected later in New Jersey than in neighboring states. This year, virus detection also occurred earlier in some states to the north (by about 6 weeks in Massachusetts and 2 weeks in New Hampshire). No detection occurred in Pennsylvania and Connecticut first detected EEE the week following New Jersey.

Figure 3. Populations of *Culiseta melanura* in two types of traps in southern New Jersey during 2008.



Light trap (Statewide) surveillance in, Dennisville 2008	Resting box (Vector) surveillance in Dennisville, 2008

Table 8. Total number of *Culiseta melanura* tested for EEE by site in 2007, together with positives and earliest isolation dates.

Site Name	Coastal or Inland	Total Pools	Total Mosquitoes	Positive pools	M FIR	Earliest Date
Corbin City	Coastal	55	161			
Dennisville	Coastal	70	598	1	1.67	15-Oct
Green Bank	Coastal	51	257	1	3.98	11-Oct
Centerton	Inland	69	642	2	3.12	1-Sep
Glassboro	Inland	41	100	1	10.00	12-Oct
Turkey Swamp	Inland	60	270			
Waterford	Inland	15	68	2	29.41	12-Sep
Statewide		**361**	**2096**	7	**3.34**	1-Sep

Eastern Equine encephalitis virus was first detected at Centerton on September 1st, three weeks later in the season than last year. The second sites for confirmed activity were at Waterford and Glassboro, suggesting that dissemination had occurred. Last infection at a traditional resting box site was detected at Dennisville on 15 October. Cape May also recorded the last positive *Cs. melanura* pool a day later in a Tuckahoe gravid trap. There were no positive EEE pools detected in other mosquito species (Table 9) nor were there other *Cs. melanura* positive pools.

Cape May County Department of Mosquito Control reported that one chicken from two sentinel flocks turned positive for EEE. As with last year, no bridge vectors were found positive with EEE. Table 9 lists all species tested for EEE.

Table 9. Total non-*Cs. melanura* species tested for EEE. No positives occurred among potential bridge vectors.

Species	Total pools	Total mosquitoes
Aedes albopictus	62	583
Aedes canadensis canadensis	21	497
Aedes cantator	3	86
Aedes cinereus	1	3
Aedes communis	1	1
Aedes grossbecki	1	1
Aedes japonicus	24	69
Aedes sollicitans	18	781
Aedes sticticus	2	5
Aedes taeniorhynchus	10	326
Aedes triseriatus	18	43
Aedes trivittatus	2	5
Aedes vexans	63	643
Anopheles bradleyi	5	30
Anopheles crucians	8	10
Anopheles punctipennis	31	71
Anopheles quadrimaculatus	25	81
Coquillettidia perturbans	26	221
Culex erraticus	79	658
Culex pipiens	39	378
Culex restuans	5	11
Culex salinarius	5	5
Culex sp.	84	750
Culex territans	11	22
Culiseta inornata	1	3
Orthopodomyia signifera	4	12
Psorophora ciliata	6	10
Psorophora columbiae	16	50
Psorophora cyanescens	1	1
Psorophora ferox	6	9
Psorophora howardii	1	3
Uranotaenia sapphirina	9	13
Statewide	**588**	**5381**

Horse and Human Involvement with EEE

No horse or human cases occurred.

Methodology of WNV Surveillance

New Jersey's WNV surveillance program in 2008 relies on significant county initiative to conduct meaningful surveillance within their county borders. Counties have various approaches to monitoring West Nile virus activity, ranging from focusing on the enzootic vector, *Culex pipiens* (primarily through the submission of Mixed *Culex* pools) to the submission of a wide range of potential bridge vectors.

The Rutgers program used gravid traps and CO_2 baited traps to collect mosquitoes from areas where human or equine cases required special surveillance investigations. The Rutgers program also conducted WNV surveillance activities for counties that requested assistance.

Results of WNV Surveillance in 2008

During the 2008 mosquito season, a total of 201,483 specimens were tested in 10,385 pools. Results from the surveillance effort produced 644 WNV positive pools, a significant increase of nearly 300 pools from the previous year. All of New Jersey's 21 county mosquito control agencies participated in the state program during 2008. Table 10 indicates species results from county and Rutgers effort in mosquito collection. As with last year, the majority of positive pools came from *Culex* species, either mixed pools or species-identified, with *Culex pipiens,* the enzootic vector of WNV showing the highest degree of infection at 5.564 mosquitoes/1000 of the three mixed species. *Culex restuans* was the second most infected species, with an MFIR value of 1.107. *Culex salinarius* was the least of the infected mosquito species with an MFIR of 0.194. The mixed *Culex* pool had an MFIR value much closer to the value for *Culex pipiens* and it is likely that *Cx. pipiens* contributes proportionally to the overall Mixed *Culex* pools.

Table 10. Mosquitoes tested for West Nile in New Jersey during 2008.

	Species	Pools	Mosquitoes Positive	MFIR
Aedes abserratus	1	9		
Aedes albopictus	124	103	3	0.291
Aedes atlanticus	2	5		
Aedes atropalpus	1	1		
Aedes canadensis canadensis	63	126		
Aedes cantator	36	41		
Aedes cinereus	3	5		
Aedes communis	1	1		
Aedes grossbecki	3	4		
Aedes japonicus	612	239	1	0.417
Aedes sollicitans	82	152		
Aedes sticticus	9	93		
Aedes stimulans	1	1		
Aedes taeniorhynchus	45	83		
Aedes thibaulti	5	13		
Aedes triseriatus	271	72		
Aedes trivittatus	24	17		
Aedes vexans	337	444		
Anopheles atropos	1	1		
Anopheles barberi	4	1		
Anopheles bradleyi	94	1301		
Anopheles crucians	11	3		
Anopheles earlei	2	2		
Anopheles punctipennis	190	1035		
Anopheles quadrimaculatus	216	2840		
Coquillettidia perturbans	111	9		
Culex erraticus	200	3284		
Culex pipiens	1399	262	146	5.564
Culex restuans	959	117	13	1.107
Culex salinarius	282	103	2	0.194
Culex spp.	3395	11	476	4.063
Culex territans	92	3		
Culiseta inornata	3	5		
Culiseta melanura	542	2969	3	1.010
Orthopodomyia signifera	12	2		
Psorophora ciliata	9	5		
Psorophora columbiae	36	2		
Psorophora cyanescens	1	1		
Psorophora ferox	39	1		
Psorophora howardii	4	1		
Uranotaenia sapphirina	45	4		
Statewide	**10385**	**2**	**644**	**3.196**

Table 11 also lists infection rates in potential bridge vectors. In 2007, WNV was detected in *Aedes albopictus, Ae. japonicus, Coquillettidia perturbans* and *Culex salinarius,* representing 4.9% of positive pools. The first two species are highly competent vectors as well as aggressive mammalian biters. *(Coquillettidia perturbans* is a mosquito that is an inefficient vector for WNV) This year, less than 1 percent of the positive pools were in species other than bird biters and the difference between the two proportions was not significantly different (z=0.076). The difference in the proportion of ornithophilic species sampled *(Culex pipiens, Culex restuans, Culex* Mixed and *Culiseta melanura)* was also not significantly different between the years (2007 = 0.724, 2008 = 0.765, z=0.015, p>0.05). Nor was there a significant difference in the number of species counties sampled from 2007 to 2008 (Paired t=0.09, n=21, p=0.46).

While counties tended to maintain their collection patterns from one year to the next, counties varied on what they collected, likely based upon many factors. The degree of urbanization is a significant feature of West Nile virus activity. The number of pools submitted by counties to detecting WNV continued to play a significant role. Last year, the total number of mosquitoes caught by a county was correlated with the number of positive pools. This year, the trend continued (Spearman's r = 0.471, n=20, p<0.05), indicating that the greater number of mosquitoes submitted by a county, the more likely the county was to find positive mosquitoes. This effect was reduced considerably from last year (Spearman's r = 0.84) as counties concentrated on detection in *Culex* species.

Table 11 indicates the cumulative infection rates in each county by the end of the 2007 season.

	Total pools	County Total	Positive pools	M FIR
Atlantic	369	7229	10	1.383
Bergen	668	30941	153	4.945
Burlington	558	4117	5	1.214
Camden	233	3840	18	4.688
Cape May	2125	28464	3	0.105
Cumberland	307	2468	8	3.241
Essex	345	3998	34	8.5 04
Gloucester	745	13156	56	4.257
Hudson	238	10373	63	6.073
Hunterdon	360	15365	9	0.586
Mercer	727	8701	79	9.079
Middlesex	352	8086	44	5.442
Monmouth	645	5805	26	4.479
Morris	231	6904	31	4.490
Ocean	454	6238	13	2.084
Passaic	121	3859	32	8.292
Salem	514	6055	1	0.165
Somerset	339	4299	16	3.722
Sussex	539	15776	8	0.507
Union	248	4739	35	7.386
Warren	267	11070	0	0.000
Grand Total	10385	201483	644	3.196

One sentinel chicken converted in Cape May county. Fifty-three birds sent to PHEL tested positive for the presence of West Nile virus. Infection rates ranged from a high of 56% in American Crows *(Corvus brachyrhynchos)* to a zero for non-corvids (species "Other").

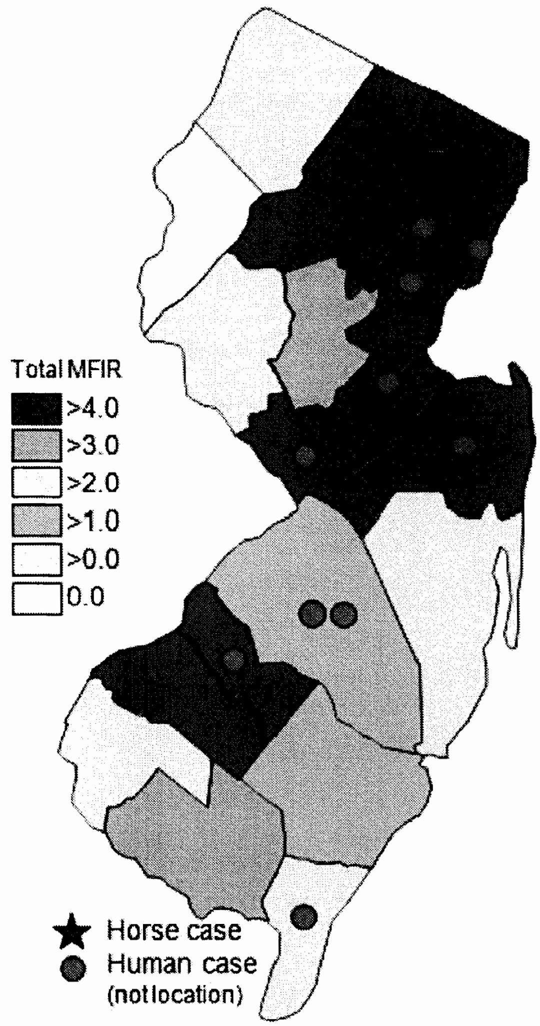
Table 12. Birds tested at PHEL for the presence of WNV and their corresponding infection rates.

Species	Negative	Positive	Tested	IR
American crow	4	5	9	0.56
Blue Jay	18	15	33	0.45
Fish crow	53	27	80	0.34
Hawk	8	2	10	0.20
Other	17		17	0.00
Unidentified	7	4	11	0.36
Crow				
All Birds	107	53	160	0.33

Horse and Human Involvement

During 2008, there were no equine cases reported. Ten human cases, two of which were fatal, occurred in eight counties (Figure 4). This represented a significant rise from the single human case of the previous year. Earliest onset of symptoms occurred on 10 August in a 65 year-old male from Middlesex County. The last human case was reported in December, but onset of symptoms was undoubtedly much earlier.

Figure 4. Cumulative WNV activity by the end of the mosquito season.

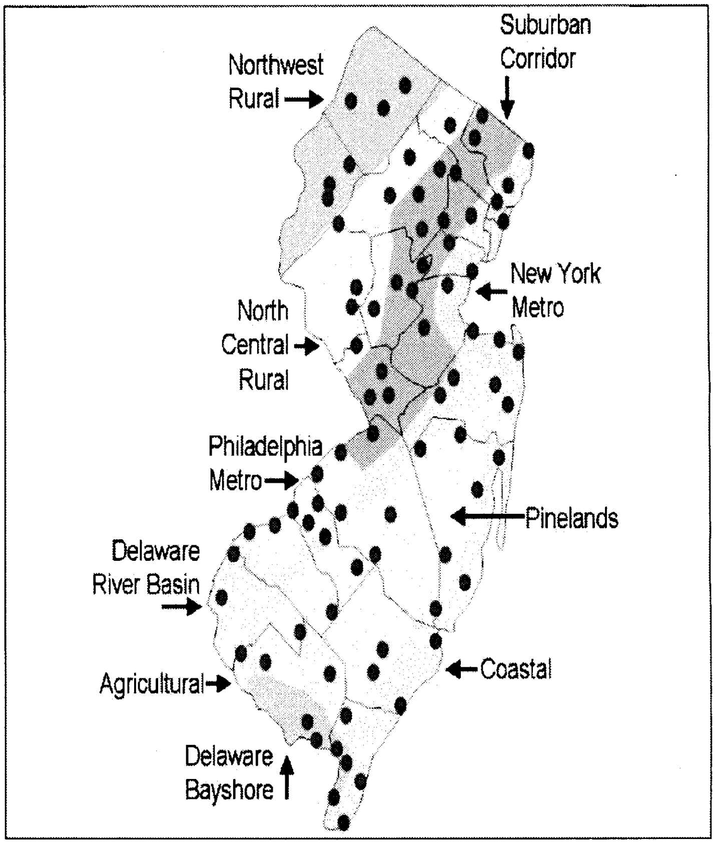


Conclusions

Eastern Equine encephalitis virus was detected only in *Culiseta melanura* and disseminated throughout southern New Jersey despite low numbers of the primary enzootic vector. WNV was largely limited to bird feeding mosquitoes in 2008 but the number of positive pools increased significantly over 2007. Positive mosquitoes involved beyond the amplification cycle included 3 pools of *Ae. albopictus,* 1 pools of *Ae. japonicus* and 2 pools of *Culex salinarius*.

Reported By Lisa Reed, Ph.D., Rutgers University.

NEW JERSEY STATEWIDE ADULT MOSQUITO SURVEILLANCE



Purpose: Data from 84 New Jersey light traps contributed by county mosquito control agencies are used to calculate trends and mosquito populations for species of nuisance or health concerns. Calculations are based on regional distributions, with emphasis on mosquito habitat and land use. Trends will allow a statewide evaluation of changing mosquito populations, in response to control and/or changes in habitat.

The State Surveillance Program Overview: In New Jersey, county-level mosquito control agencies use New Jersey light traps to monitor certain nuisance and health-risk mosquito species. Agencies have many years worth of experience in the placement, use, and interpretation of light traps and their data as monitoring mosquito populations is an essential part of an integrated pest management approach. But county agencies are limited to county data, and a landscape-wide computer-generated view of changing mosquito trends is not currently available. The purpose of this program is to cover that gap and provide information of nuisance and health-risk mosquito populations on a regional level.

The 2008 Season: Nineteen of the 21 county mosquito control agencies participated in this program during the season. Two counties unable to participate during the regular season submitted data after the season. Most agencies provided data in a timely manner. However, most agencies were occasionally pressed to get the data to Headlee Labs prior to report preparation. Therefore, interpretation of the data is more robust for the previous weeks' report than during the current week. Care must be taken with the interpretation of the most current week's data.

As in 2007, 34 mosquito species were identified out of the 174,914 individual mosquitoes caught in the statewide surveillance light trap network throughout New Jersey. This represents an increase from the previous year of overall mosquitoes caught, yet is still well below the large numbers generated in 2004, with over 300,000 individuals from 42 species found in the traps.

The Pinelands and Suburban Corridor collected a wider variety of mosquitoes than other regions. The number of traps set for each region is not significantly correlated with the number of species found (Table 13. Pearson's $r=0.369$, $df=8$, $p > 0.05$) so that regions with a larger number of species caught are not doing so because a greater number of traps are able to sample more environments. The Suburban Corridor may represent a more diversified habitat. The largest increase in the number of species caught from the previous year occurred in the Pinelands region.

Table 13. Number of county traps used in each region with the number of mosquito species identified in the traps.

Region	*Number of Traps*	Number of Species
Agricultural	6	28
Coastal	9	29
Delaware Bayshore	6	23
Delaware River Basin	4	18
New York Metro	10	28
North Central Rural	8	19
Northwestern Rural	7	23
Philadelphia Metro	6	23
Pinelands	11	31
Suburban	17	31
Statewide Total	84	34

The most abundant species collected statewide were the *Culex* Mixed (including *Cx. pipiens, Cx. restuans* and *Cx. salinarius), Aedes vexans, Ae. sollicitans* and *Ae. cantator* (Figure 5). *Coquillettidia perturbans* increased to 5th most abundant from 7th of last year, while *Aedes japonicus* decreased from 14th to 18th. In 6 of the 10 regions (Figures 6 - 15), the Mixed *Culex* populations, the enzootic/epizootic vector of West Nile virus, were in greatest number. In most other areas, *Ae. vexans* was the predominant species attracted to New Jersey light traps. This species can transmit dog heartworm and is an abundant pest in all regions (except, relatively speaking, in the Delaware Bayshore where this species ranks low, but numbers are still generally high). *Ae. sollicitans* is a significant pest in 4 of the regions, but is outnumbered by *Culex* species in the Coastal region. *Aedes sollicitans* and *Culex* species were slightly less abundant than *Anopheles quadrimaculatus* in the Delaware Bayshore region. A calibration class in the spring prior to the 2008 mosquito season was offered to any county that wished to learn about the proper maintenance and calibration of light traps of which several counties attended. Clean and calibrated traps infer compatibility of the dataset.

Figure 5. Cumulative totals for light trap species statewide, 2008.

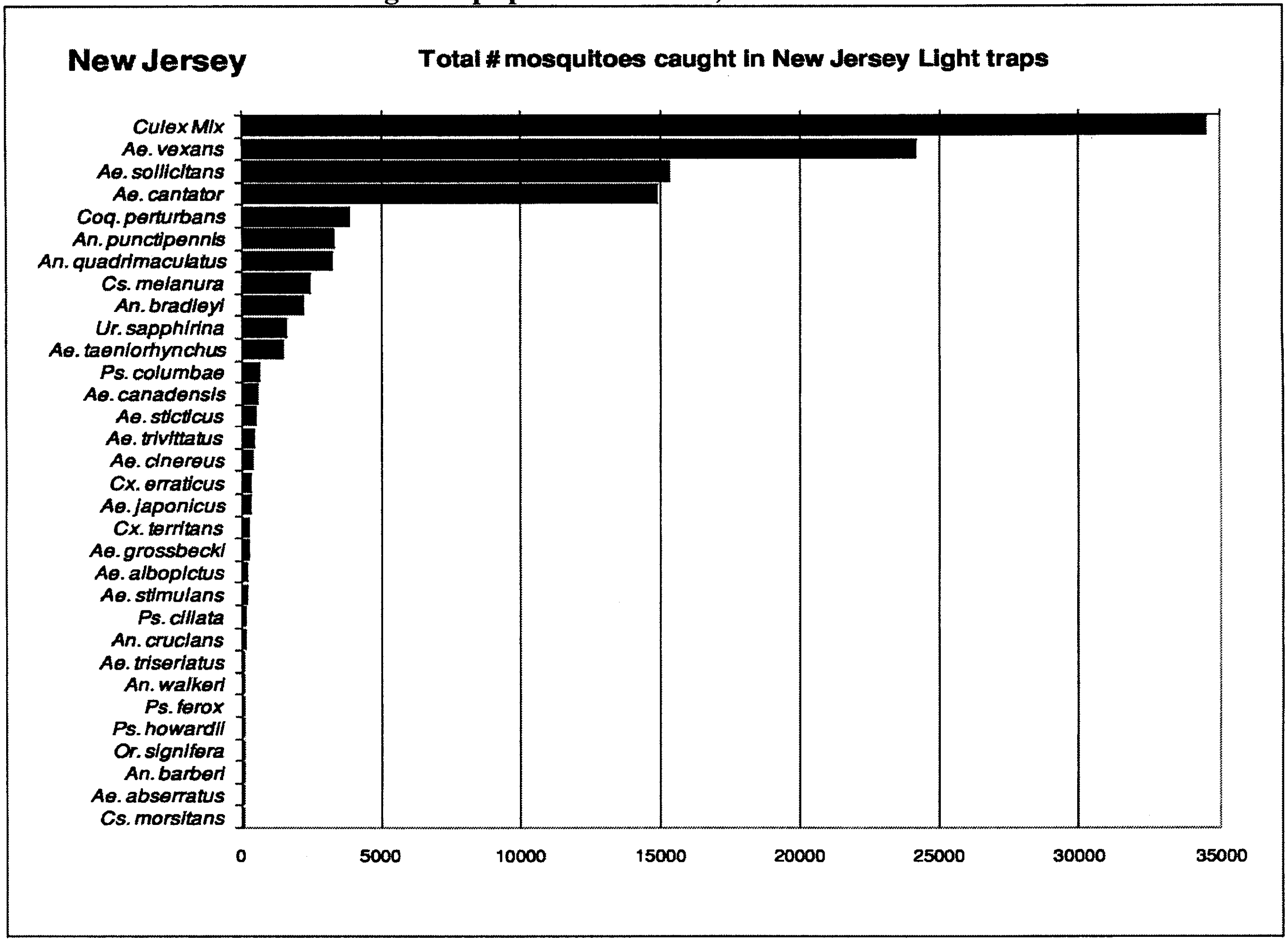


Figure 6. Agricultural Region

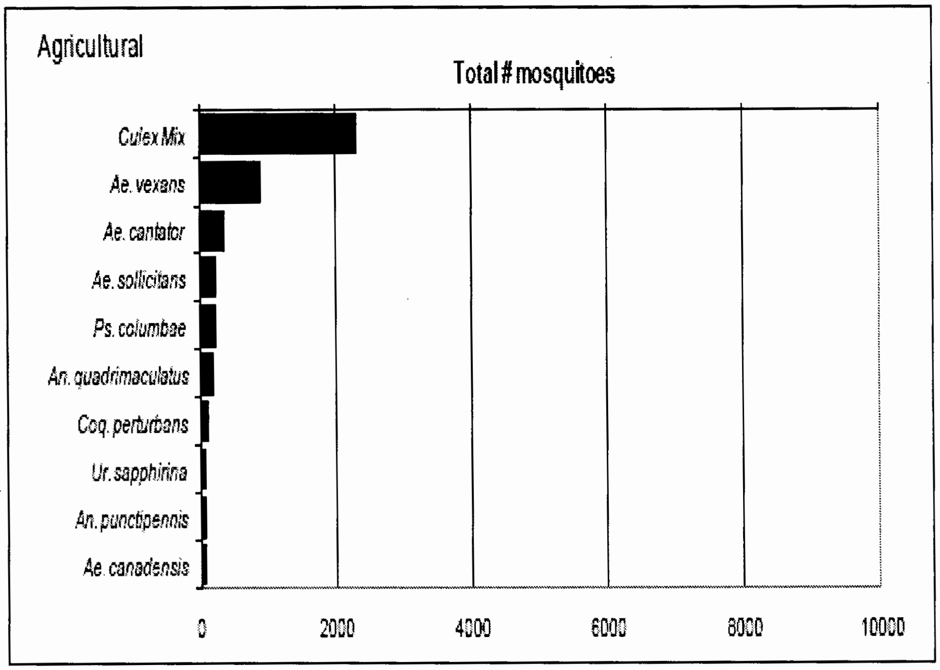


Figure 7. Coastal Region

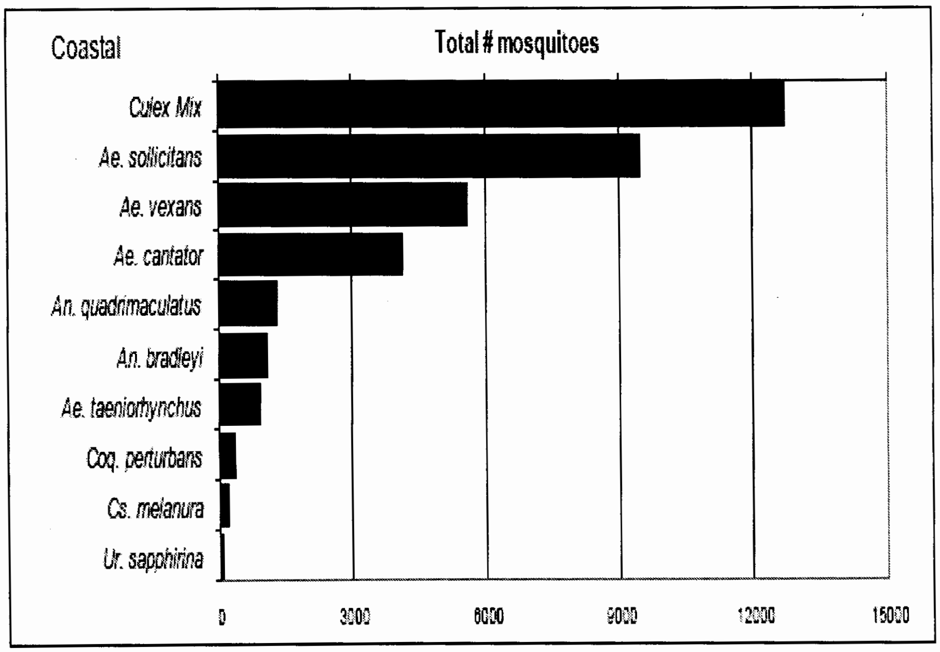


Figure 8. Delaware Bayshore Region

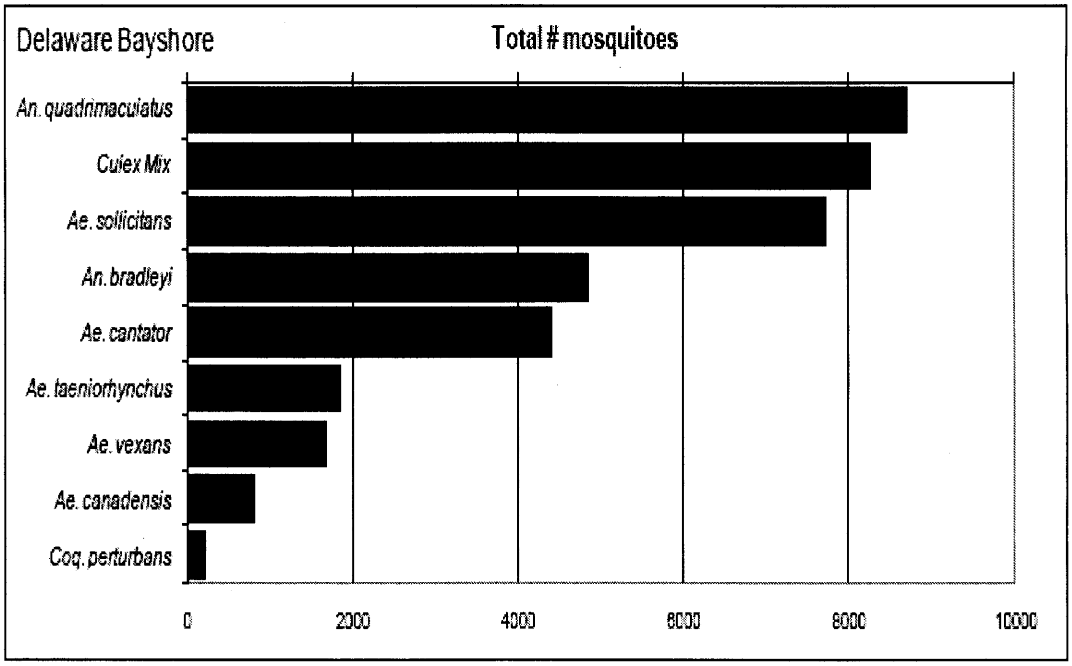


Figure 9. Delaware River Basin Region

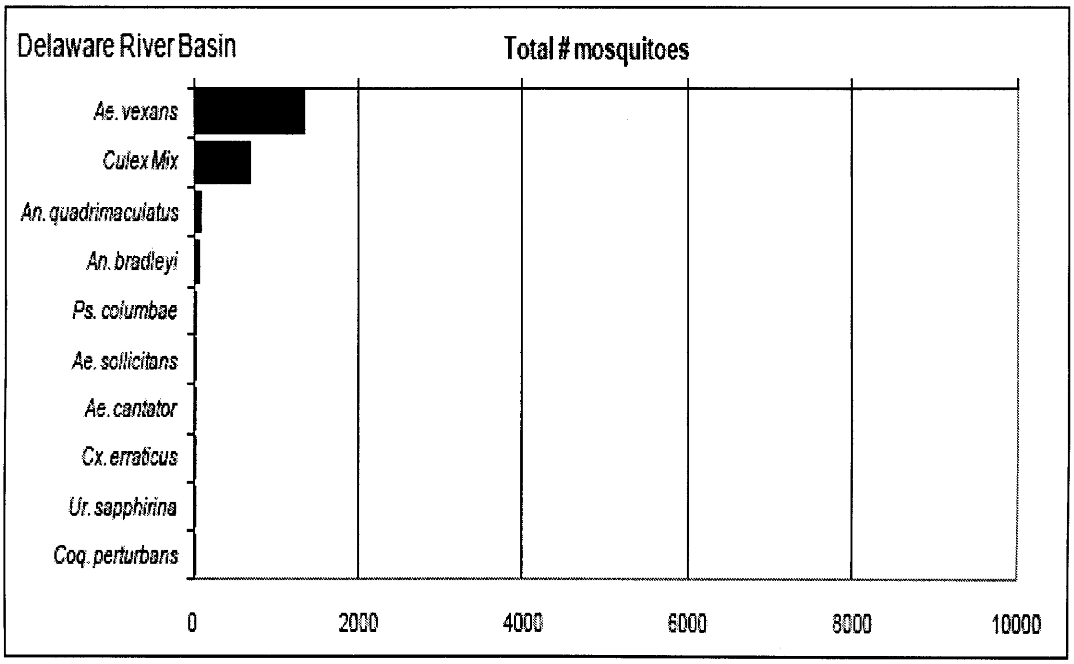


Figure 10. New York Metropolitan Region

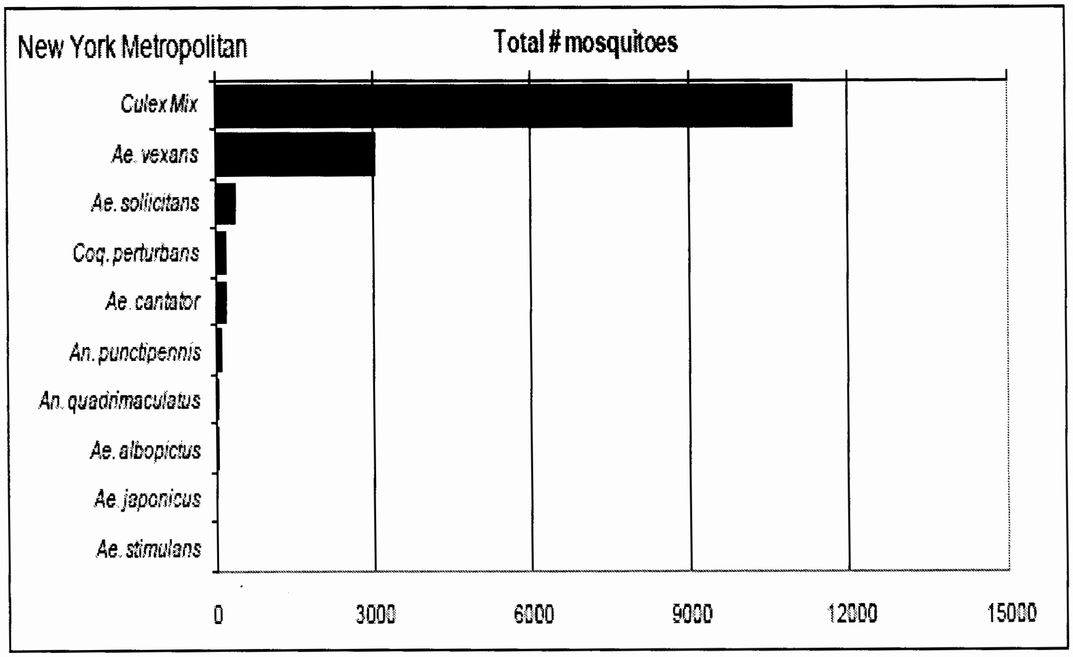


Figure 11. North Central Rural Region

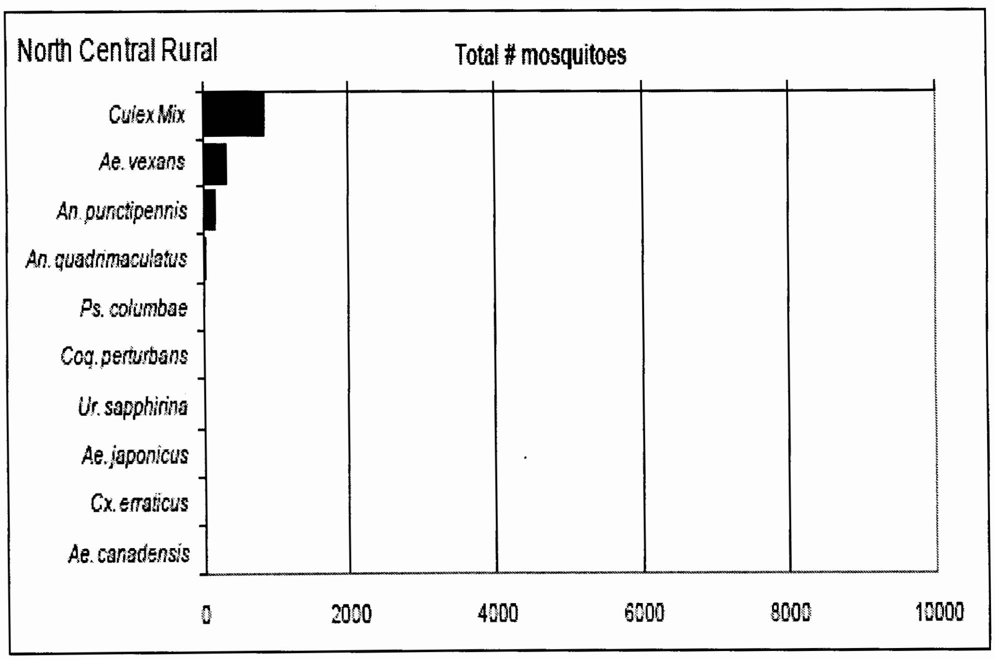


Figure 12. Northwestern Rural Region

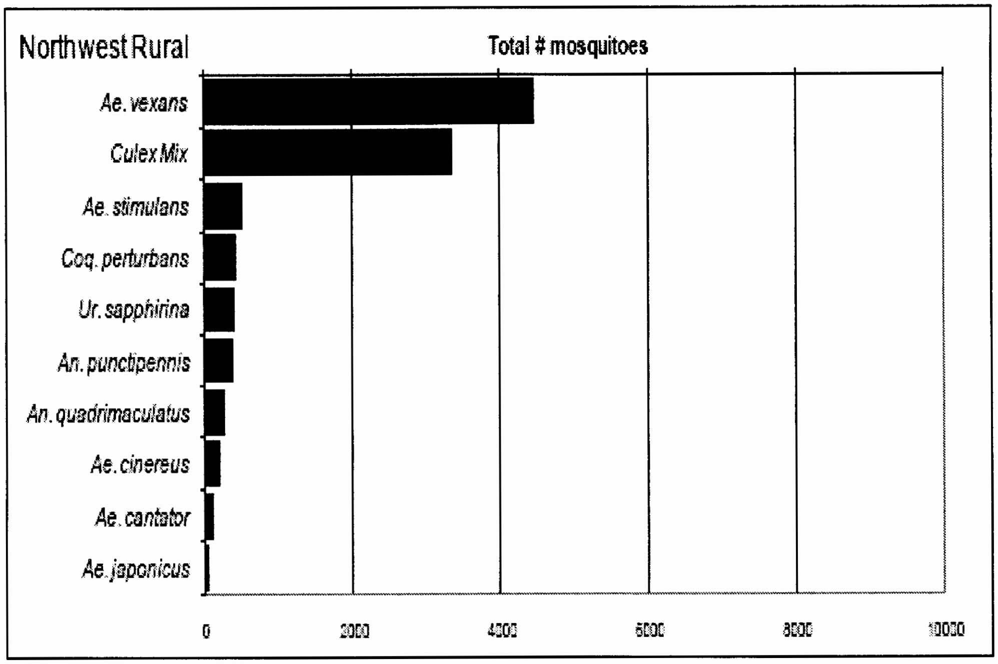


Figure 13. Philadelphia Metropolitan Region

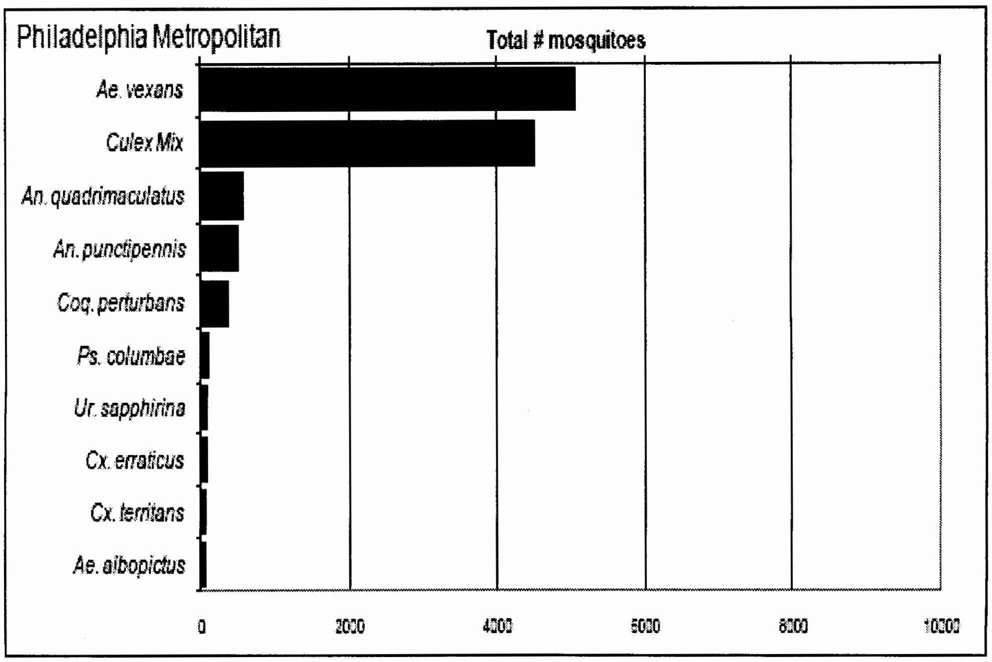


Figure 14. Pineland Region

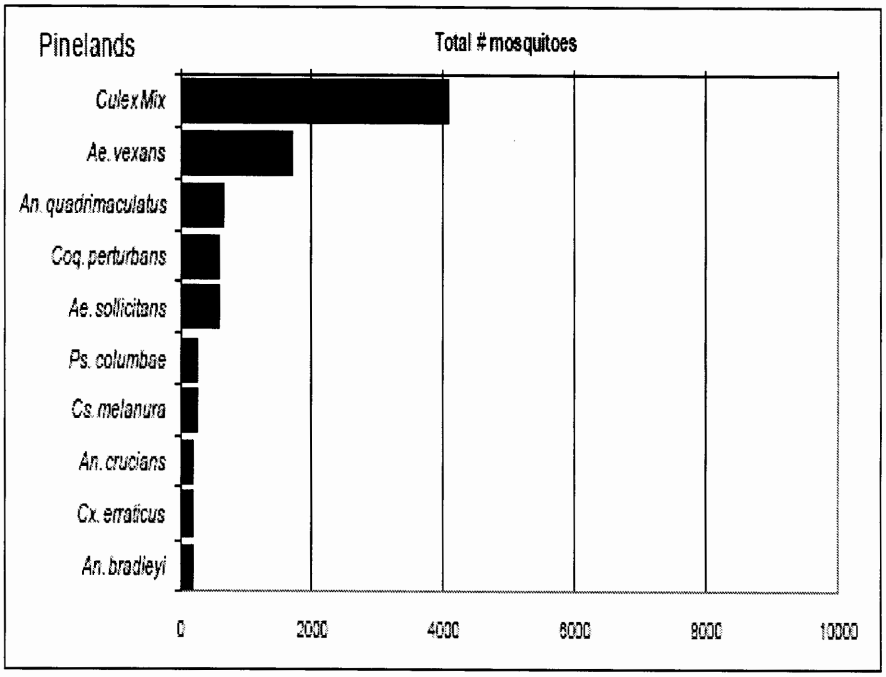
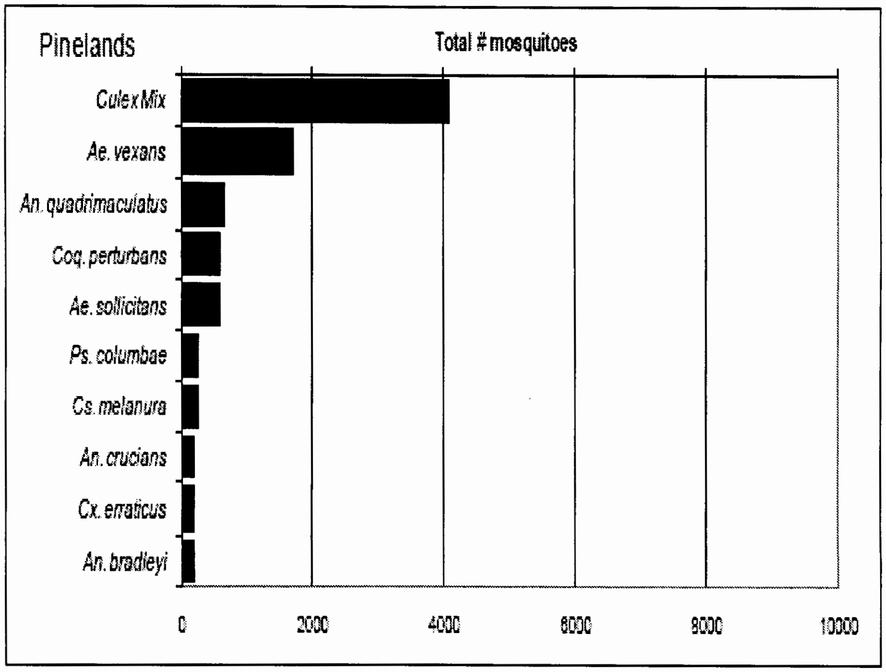


Figure 15. Suburban Corridor Region



RUTGERS
New Jersey Agricultural Experiment Station

NEW JERSEY ADULT MOSQUITO SURVEILLANCE

Report for 29 June to 05 July 2008, CDC Week 27

Prepared by Lisa M. Reed, Scott Crans and Dina Fonseca
Center for Vector Biology

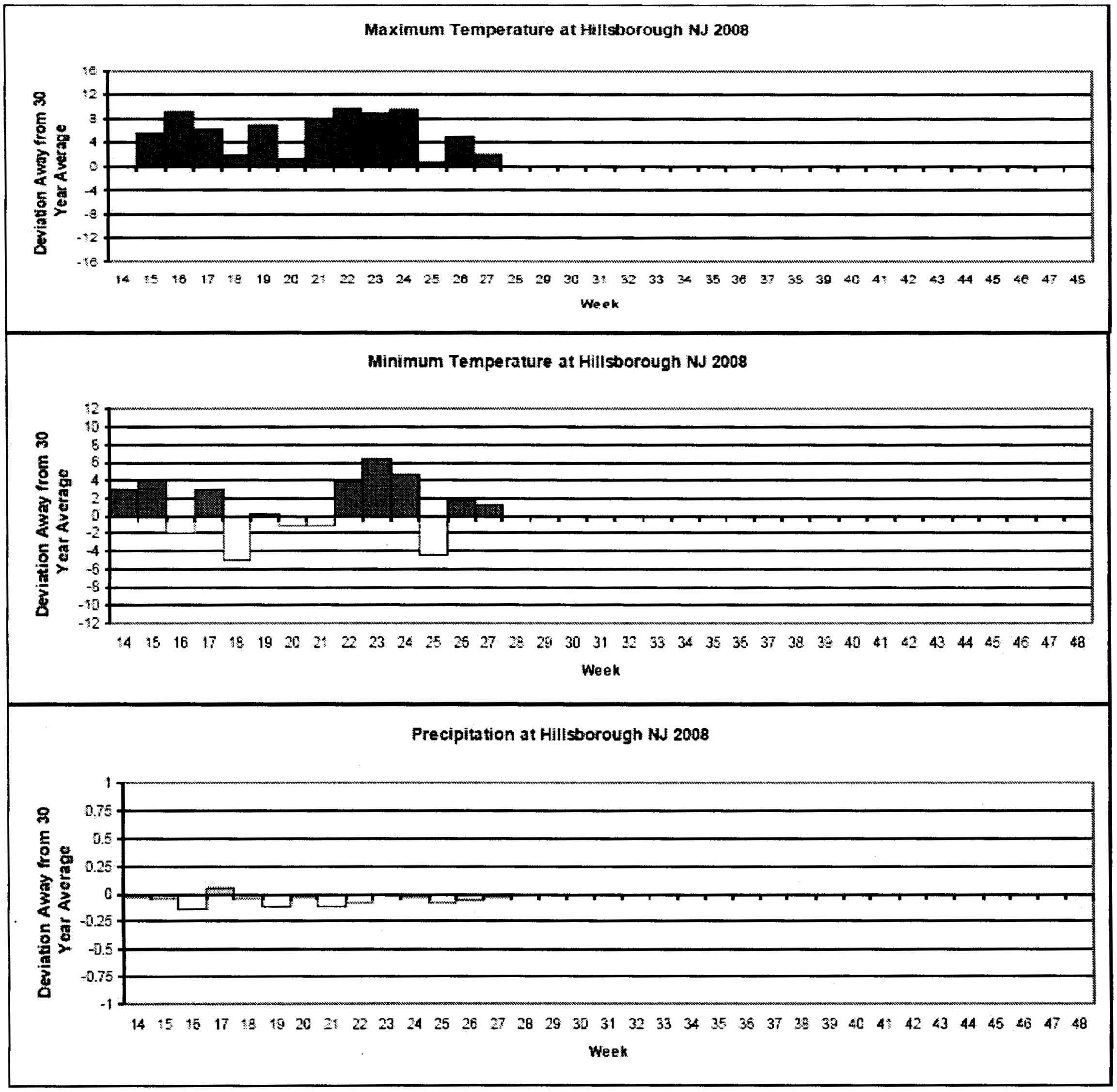
This New Jersey Agricultural Experiment Station report is supported by Rutgers University, Hatch funds, funding from the NJ State Mosquito Control Commission and with the participation of the 21 county mosquito control agencies of New Jersev.

Summary table – Week 27

	Aedes vexans			*Culex* Mix			*Coquillettidia perturbans*			*Aedes sollicitans*		
Region	This Week	Average*	Increase	This Week	Average*	Increase	This Week	Average*	Increase	This Week	Average*	Increase
Agricultural	0.11	6.88	0	0.81	4.90	0	0.37	0.67	0	0.03	0.67	0
Coastal	1.60	7.38	0	0.89	11.30	0	0.00	1.82	0	0.89	14.53	0
Delaware Bayshore	0.05	4.90	0	1.33	53.35	0	0.00	4.46	0	0.14	15.49	0
Delaware River Basin	0.00	26.69	0	0.00	9.76	0	0.00	0.34	0	0.00	0.30	0
New York Metro	0.81	4.50	0	1.73	11.59	0	0.03	0.22	0	0.11	0.77	0
North Central Rural	0.00	0.90	0	0.06	1.53	0	0.00	0.00	0	0.00	0.00	0
Northwest Rural	3.77	23.28	0	0.83	4.66	0	0.03	0.00	0	0.00	0.00	0
Philadelphia Metro	3.76	19.00	0	6.90	12.14	0	2.63	0.11	4	0.00	0.00	0
Pinelands	0.94	3.15	0	2.92	6.21	0	0.90	0.77	1	0.03	0.21	0
Suburban Corridor	0.51	12.01	0	1.12	3.94	0	0.13	0.03	4	0.00	0.01	0

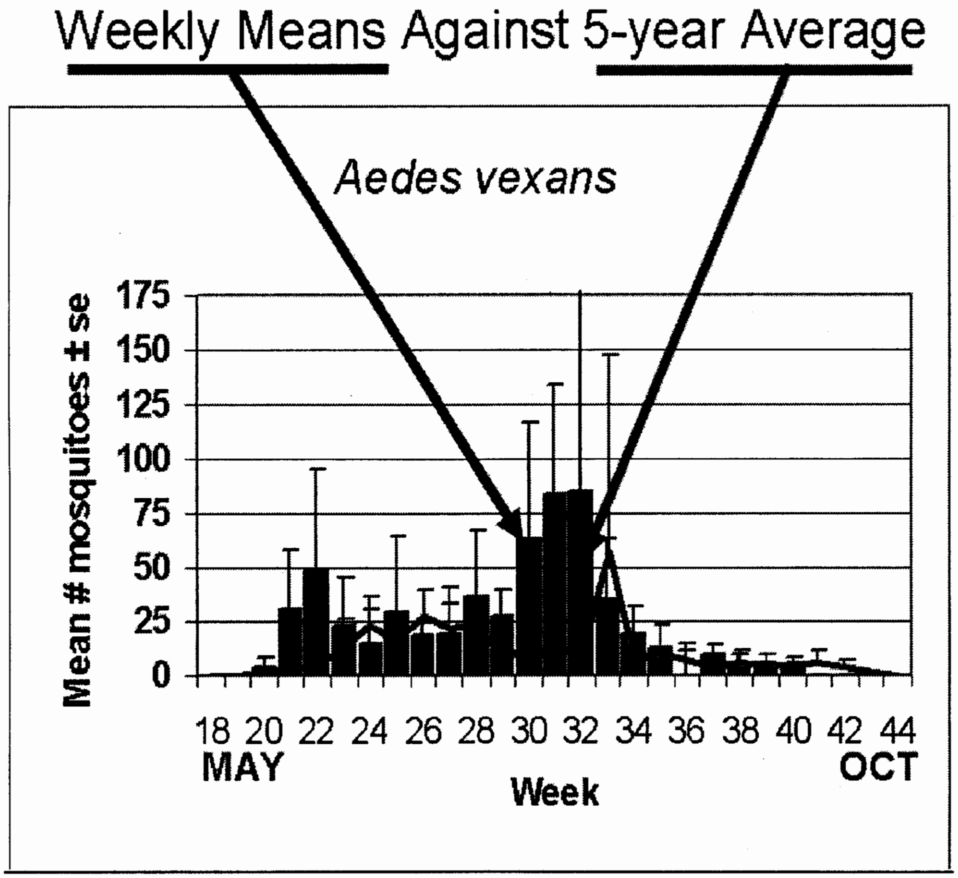
Averages represent data from, at most, the previous 5 years. Increase is a scale of current values from historical values where no difference or a decrease is represented by 0 (blue), up to 50% greater difference by 1 (green), up to 100% greater difference by 2 (yellow), up to 150% greater difference by 3 (orange) and greater than 150% increase by 4 (red). White cells denote increases from an historic zero and thus no value can be appropriately given.State Summary: The presence of *Coquillettidia perturbans* continues to be felt along the Suburban Corridor, Pinelands and the Philadelphia Metro regions.

Climate Deviations

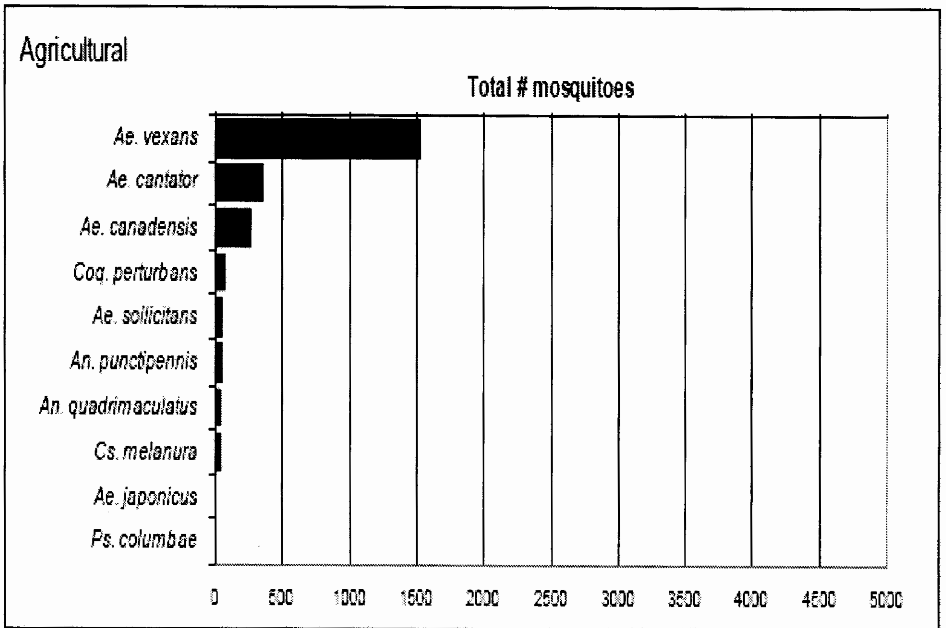


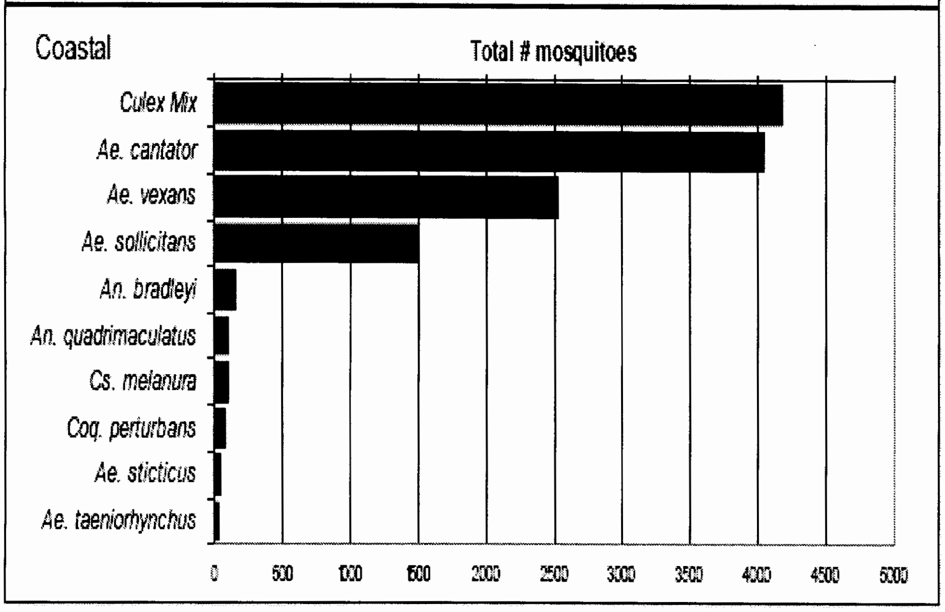
The figures show the average maximum temperature, minimum temperature and precipitation deviations from 30 year averages. Current data is from the Hillsborough NJ weather station (a station close to central NJ which recorded all three parameters and was available online at the NJ state climatologist) while historical data was from the New Brunswick weather station. Color bars above the zero line indicate warmer maximum or minimum temperatures and wetter conditions while white bars indicate cooler temperatures and dryer conditions.

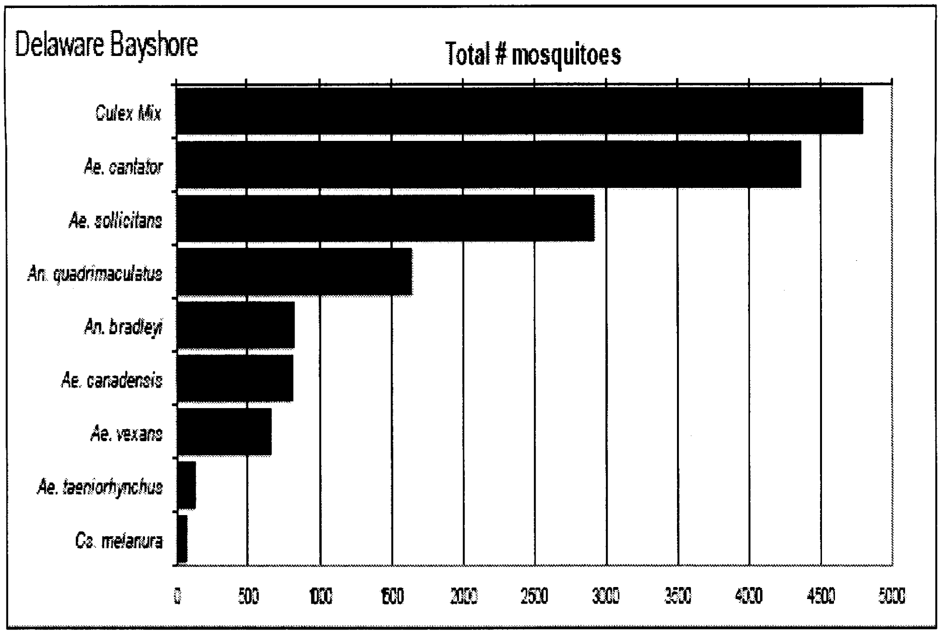
The Species Graphs: The species graph pages include a graph with two plots for each of the ten regions defined on the first page (Agricultural, Coastal, Delaware Bayshore, Delaware River, New York Metro, North Central, Northwestern, Philadelphia Metro, Pinelands, and Suburban Corridor). Below is an example of one graph from one species within one region. The bar plots show the average number of mosquitoes per trap within the region (weekly means) and line plots show the historical trend as the average number of mosquitoes from the previous 5 years (5-year average). In general, historical data are running means from the previous 5 years, but on occasion, will include data from fewer years. Adjustments are made to account for year discrepancies. Data for this week are from Atlantic, Bergen, Burlington, Camden, Cumberland, Essex, Mercer, Monmouth, Ocean, Union and Warren counties. Note: County data is sent in at a variety of times during the week.



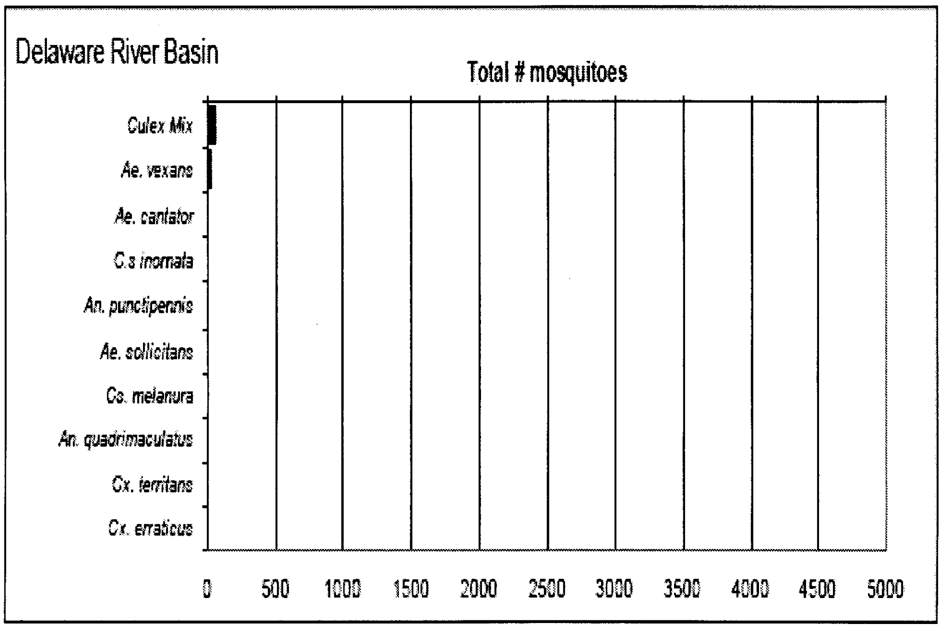
Top Ten Mosquito Species/Region



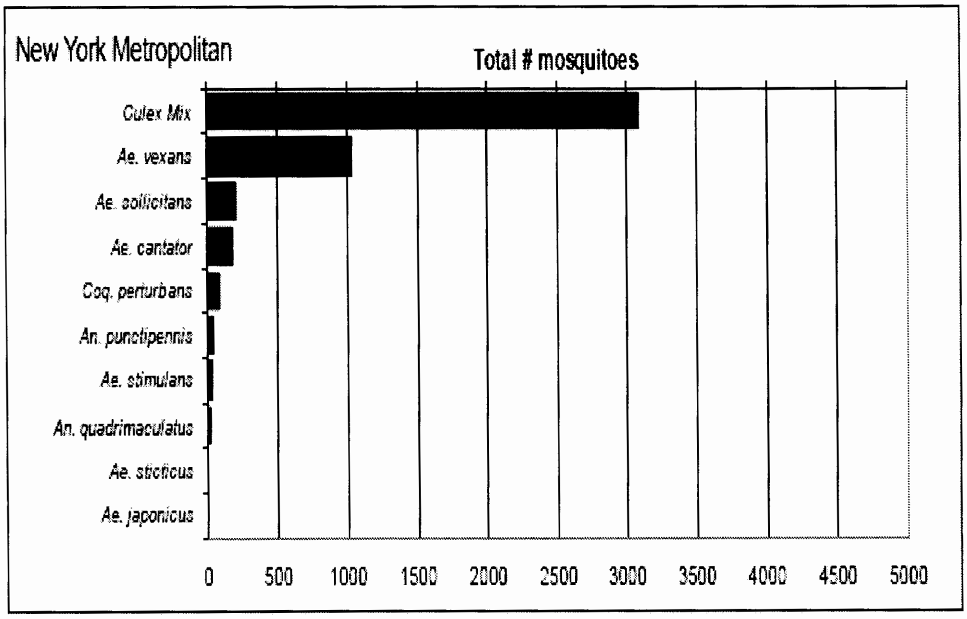




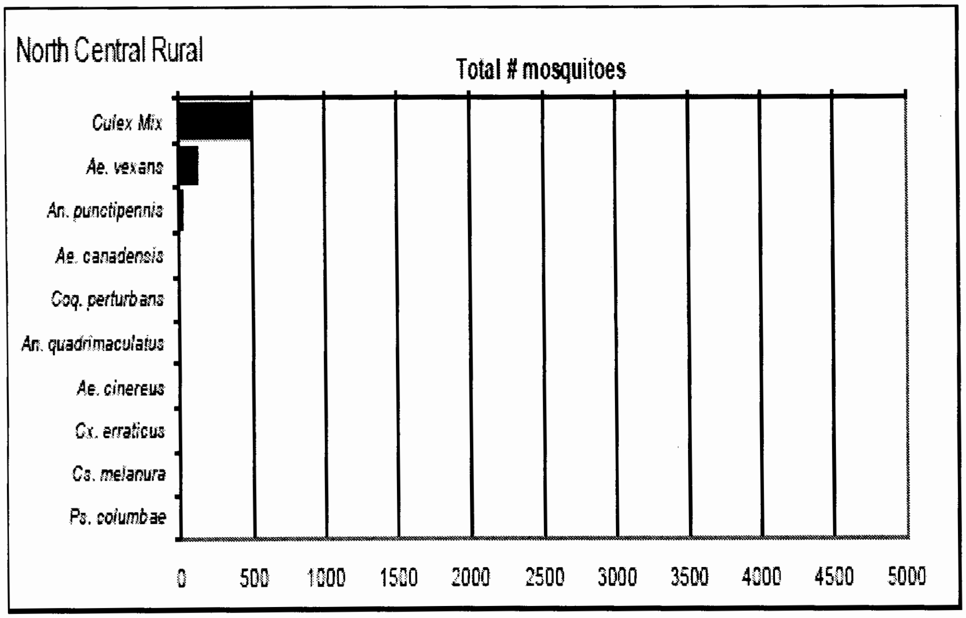
Delaware Bayshore
Total # mosquitoes
Culex Mix
Ae. cantator
Ae. sollicitans
An. quadrimaculatus
An. bradleyi
Ae. canadensis
Ae. vexans
Ae. taeniorhynchus
Cs. melanura
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000



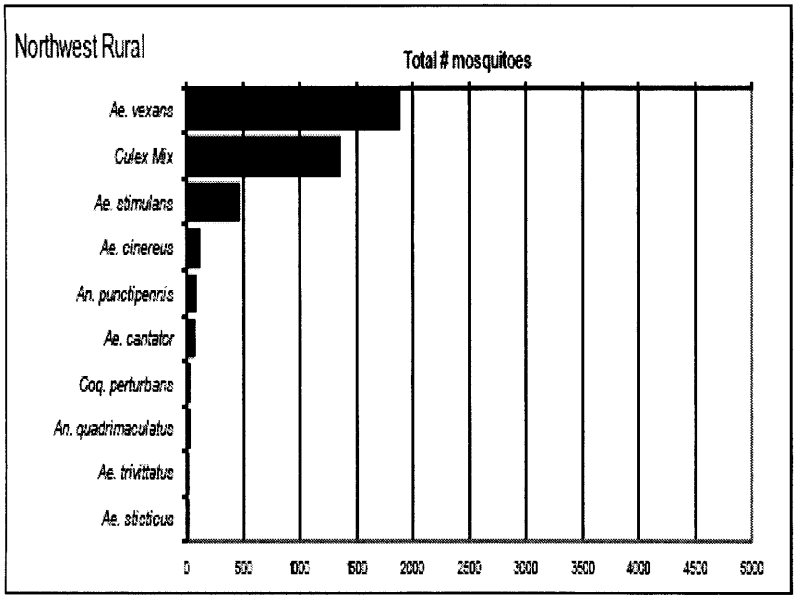
Delaware River Basin
Total # mosquitoes
Culex Mix
Ae. vexans
Ae. cantator
Cs inornata
An. punctipennis
Ae. sollicitans
Cs. melanura
An. quadrimaculatus
Cx. territans
Cx. erraticus
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000

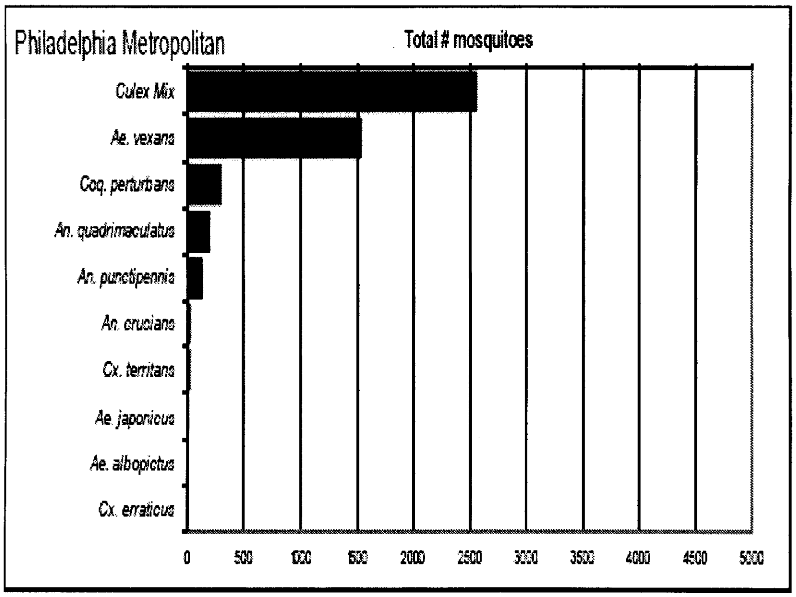


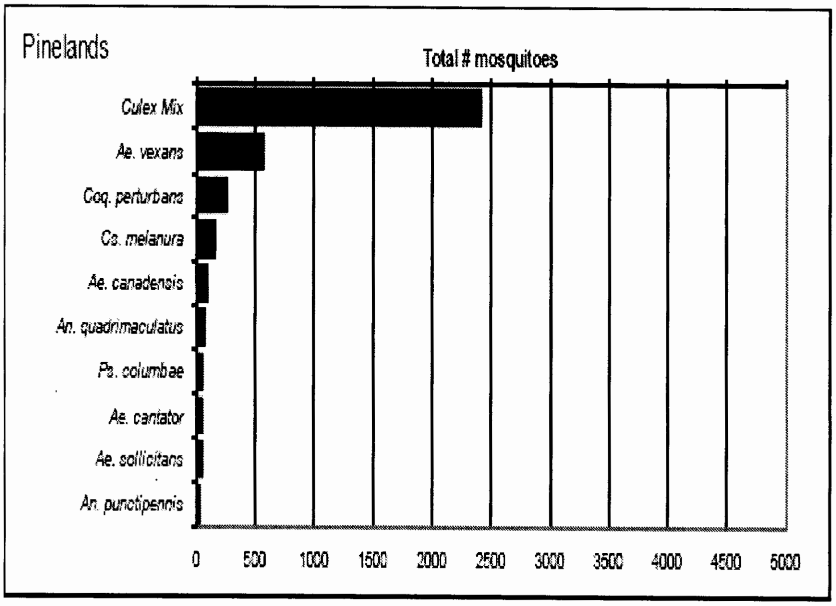
New York Metropolitan
Total # mosquitoes
Culex Mix
Ae. vexans
Ae. sollicitans
Ae. cantator
Coq. perturbans
An. punctipennis
Ae. stimulans
An. quadrimaculatus
Ae. sticticus
Ae. japonicus
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000

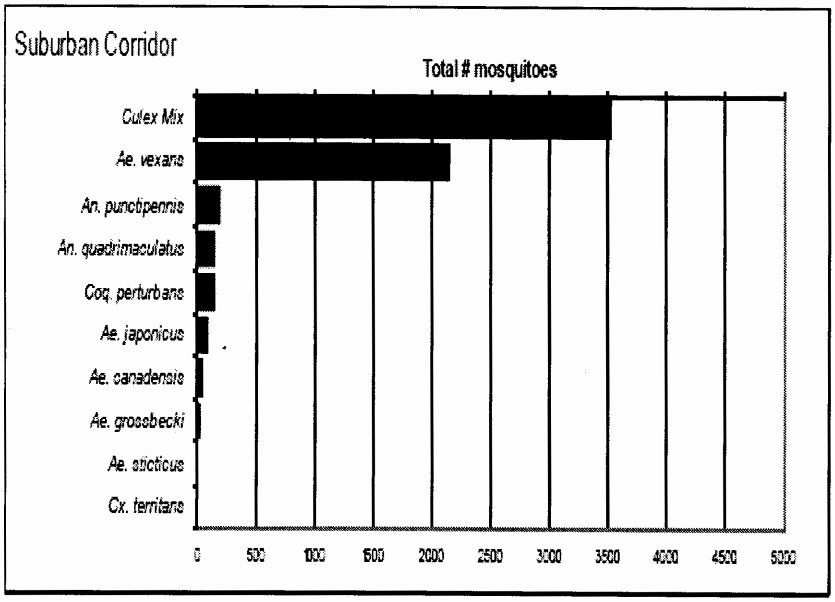


North Central Rural
Total # mosquitoes
Culex Mix
Ae. vexans
An. punctipennis
Ae. canadensis
Coq. perturbans
An. quadrimaculatus
Ae. cinereus
Cx. erraticus
Cs. melanura
Ps. columbae
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000


Northwest Rural
Total # mosquitoes
Ae. vexans
Culex Mix
Ae. stimulans
Ae. cinereus
An. punctipennis
Ae. cantator
Coq. perturbans
An. quadrimaculatus
Ae. trivittatus
Ae. sticticus
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000


Philadelphia Metropolitan
Total # mosquitoes
Culex Mix
Ae. vexans
Coq. perturbans
An. quadrimaculatus
An. punctipennis
An. crucians
Cx. territans
Ae. japonicus
Ae. albopictus
Cx. erraticus
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000





Reported By Lisa Reed, Ph.D., Rutgers University

STATE MOSQUITO CONTROL COMMISSION
FINANCIAL STATEMENT
Fiscal Year 2008-09

FY'09 STATE MOSQUITO CONTROL, RESEARCH, ADMINISTRATION AND OPERATIONS APPROPRIATION	**$1,518,000.00**
Office of Mosquito Control Coordination	**($ 380,000.00)**
FY'09 STATE MOSQUITO CONTROL COMMISSION	**$1,138, 000.00**

PROGRAMS/SERVICES	ALLOCATED	EXPENDED	BALANCE
Administration	$1,800.00	$1,073.71	$726.29
Toll-Free number ($198.38) Audio-Tapes ($18.33) Coffee & danish - July Mtg. ($40.00) Coffee & danish - Aug. Mtg. ($40.00) Coffee & danish - Sept. Mtg. ($40.00) MMWR report ($325.00) Coffee & danish - Dec. Mtg. ($40.00) Coffee & danish - Jan. Mtg. ($40.00) Coffee & danish - Feb. Mtg. ($40.00) Coffee & danish - Mar. Mtg. ($40.00) NJMCA- mtg. registration ($170.00) Coffee & danish - Apr. Mtg. ($40.00) Coffee & danish - June Mtg. ($40.00)			
Equipment Repairs/Purchases	$39,049.68	$39,041.38	$8.30
Hyd. Exc. Thumb-Salem ($14,331.77) Lettering, Seals ($1,256.00) Hyd. Ex. Repair-Essex ($4,000.00) Hyd. Ex. Part- Warren ($8,725.35) ATV tracks- Ocean ($5,000.00) Hyd. Ex. Repair-Cumb. ($1,089.06) Truck Repair- Sussex ($1,340.00) Marsh Master- Parts ($3,299.20)			

State Airspray Program	$578,309.65	$578,309.65	$0.00
Insecticides ($21,542.40)			
Insecticides ($28,723.20)			
Insecticides ($6,358.00)			
Aircraft ($49,682.40)			
Insecticides ($1,110.00)			
Insecticides ($21,542.40)			
Aircraft ($47,731.80)			
Aircraft ($97,743.00)			
Teflon slides ($460.00)			
Calibration ($3,312.50)			
Aircraft ($77,327.47)			
Aircraft ($81,376.73)			
Aircraft ($49,999.55)			
Insecticides ($91,400.00)			
Education and Information			
Public Relations	$2,000.67	$2,000.67	$0.00
MOA'S			
DH/SS WNV Testing	$160,500.00	$160,500.00	$0.00
Biological Control-Mosquitofish	$25,000.00	$25,000.00	$0.00
Biological Control-Copepods	$25,000.00	$25,000.00	$0.00
Courier for Specimen Transport-North	$ 6,500.00	$ 6,500.00	$0.00
Courier for Specimen Transport-South	$ 6,500.00	$ 6,500.00	$0.00
Research-Trans. Cycle WNV	$0.00	$0.00	$0.00
Professional Services			
Vector Surveillance ($190,000.00)	$293,340.00	$293,340.00	$0.00
Monitor of Insecticides ($66,340.00)			
Statewide Surveillance ($37.000.00)			
RASP Pilot project ($0.00)			
Total	$1,138,000.00	$1,137,265.41	$734.59

COMMISSION-SUPPORTED PUBLICATIONS AND PRESENTATIONS

JULY 1, 2008 – JUNE 30, 2009

Bartlett, Kristen, Lisa Reed, Mark Nelder, Ary Farajollahi, and Linda McCuiston, 2009. Is *Culex erraticus* Expanding its Range Northward in New Jersey. Proc. New Jersey Mosquito Control Association. In Press.

Kent, R. 2009. NJ State Mosquito Control Commission and the Office of Mosquito Control Coordination Activities in 2008. Proc. New Jersey Mosquito Control Association. In Press.

Reed, L. , 2008. Vector and Mosquito Population Surveillance in New Jersey, 2008. Proc. Northeastern Mosquito Control Association, Plymouth Massachusetts. Presentation .

Reed, L., Scott Crans, Dina Fonseca, Marc Slaff, and Randy Gaugler. 2009
NJ Vector and Adult Mosquito Surveillance. Proc. New Jersey Mosquito Control Association. In Press

Reed, L., Scott Crans, Dina Fonseca, Marc Slaff, and Randy Gaugler. 2009. NJ Vector and Adult Mosquito Surveillance. Proc. New Jersey Mosquito Control Association. In Press.

Reed, L. M., Johansson, M. A., Panella, N., McLean, R. Creekmore, T., Puelle, R. and Komar, N. 2009 Declining mortality in American crow (*Corvus brachyrhynchos*) following natural West Nile infection. Avian Diseases (in print).