

**FIFTY FIRST ANNUAL REPORT**  
**OF THE**  
**STATE MOSQUITO CONTROL COMMISSION**  
**OF THE**  
**STATE OF NEW JERSEY**



For the Fiscal Year commencing July 1, 2006 and ending June 30, 2007



**State of New Jersey**

DEPARTMENT OF ENVIRONMENTAL PROTECTION

STATE MOSQUITO CONTROL COMMISSION

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**JOHN S. CORZINE**  
*Governor*

**LISA P. JACKSON**  
*Commissioner*

To: The Honorable Jon S. Corzine, Governor  
and the 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 First Annual Report of the State Mosquito Control Commission for the Fiscal Year covering the period from July 1, 2006 through June 30, 2007.

Respectfully,

A handwritten signature in black ink, appearing to read "John Sarnas".

John Sarnas, Chairman

Dr. Kenneth Bruder

John Surmay

Daniel Konczyk

David Adam

Anthony Petrongolo

Shereen Brynildsen

Mark Mayer

**FIFTY FIRST  
ANNUAL REPORT**

**NEW JERSEY STATE MOSQUITO CONTROL COMMISSION**

**2007**



**STATE OF NEW JERSEY  
JON S. CORZINE, GOVERNOR**

**NJ DEPARTMENT OF ENVIRONMENTAL PROTECTION  
LISA P. JACKSON, COMMISSIONER**

Report prepared by the Office  
of Mosquito Control Coordination,  
NJ Department of Environmental Protection  
Robert Kent, Administrator  
Claudia O'Malley, Principal Biologist  
Steven Csorgo, Jr., Assistant Biologist  
Eileen Shields, Secretary

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## MEMBERS OF THE STATE MOSQUITO CONTROL COMMISSION

John Sarnas, Chairman	Hudson County
Kenneth Bruder, Ph.D.	Ocean County
John Surmay	Union County
Daniel Konczyk	Cape May County
David Adam, M.S.	Somerset County
Dr. Mark Robson <i>Ex Officio</i>	N.J. Agricultural Experiment Station, Rutgers University
Dr. Fred Jacobs, Commissioner <i>Ex Officio</i>	N.J. Department of Health & Senior Services
Charles Kuperus, Secretary <i>Ex Officio</i>	N.J. Department of Agriculture
Lisa Jackson, M.S., Commissioner <i>Ex Officio</i>	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 Brynildsen	N.J. Department of Health & Senior Services
Anthony Petrongolo	N.J. Department of Environmental Protection
Mark Mayer	N.J. Department of Agriculture

## **COMMISSION ACTIVITIES AND HIGHLIGHTS DURING FISCAL YEAR 2007**

During the fiscal year 2006-2007, 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 Commission were held monthly during the year on the following dates and at the following locations:

<b>DATE</b>	<b>LOCATION</b>
July 18, 2006	Canceled
August 15, 2006	Canceled
September 19, 2006	Office of Mosquito Control Coordination, DEP, Trenton, NJ
October 17, 2006	Office of Mosquito Control Coordination, DEP, Trenton, NJ
November 21, 2006	Office of Mosquito Control Coordination, DEP, Trenton, NJ
January 15, 2007	Office of Mosquito Control Coordination, DEP, Trenton, NJ
February 19, 2007	Office of Mosquito Control Coordination, DEP, Trenton, NJ
March 18, 2007	Office of Mosquito Control Coordination, DEP, Trenton, NJ
April 15, 2007	Office of Mosquito Control Coordination, DEP, Trenton, NJ
May 20, 2007	Office of Mosquito Control Coordination, DEP, Trenton, NJ

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.

## **NJ State Mosquito Control Commission Annual Report FY 2006-2007**

The fiscal year began in July with continued challenges, both operationally and administratively and with significant changes in the composition of the commission's membership. Even in the face of such challenges all Commission-supported programs continued to operate successfully with surveillance and control results as evidence.

Surveillance for the mosquito-borne viruses West Nile Virus (WNV) and Eastern Equine Encephalitis (EEE) was successfully performed by way of the Statewide Surveillance and Vector Surveillance Programs. In addition, resources supplied by the NJDEP, Division of Fish and Wildlife's Office of Wildlife Pathology, resulted in ten more counties gaining the benefit of "RAMP Systems". These systems include Rapid Analyte Measurement Platforms, centrifuges, autoclaves and other laboratory bench equipment. By way of the purchase and assignment of these systems, the surveillance in the field for WNV, county programs have greater capacity for swift detection of infected mosquito populations.

Other equipment matters included a significant number of transfers from county-to-county, the declaration of several pieces as obsolete or derelict and the pursuit of new, capital equipment for eventual assignment.

Continued management of aerial operations by the NJDEP Office of Mosquito Control Coordination was limited to surveillance flights and the application of larval control formulations. The significance of this accomplishment may be measured by the fact that for the first time since the use of state-contracted aircraft for the control of adult mosquitoes was established in 1949, no such applications were required.

The Bio-Control Program continued to offer an almost unlimited amount of mosquito larvae-eating fish which, when introduced to appropriate habitat, provided insecticide free control of developing mosquitoes. Over 150,000 fish were stocked in 12 different counties this past year; many counties received multiple deliveries.

The newest component of the Bio-Control Program, the copepod project continued to make progress as the partnership with the Department of Agriculture's, Beneficial Insect Laboratory bore fruit as field studies of the crustaceans and their ability to overwinter in New Jersey and survive multiple seasons, continued.

The State Vector Surveillance Program succeeded via the continued partnership between the NJ Agricultural Experiment Station, the NJ Department of Health and Senior Services Public Health and Environmental Laboratory, and the twenty one county mosquito control agencies in the state. The effort resulted in detected levels of Eastern Equine Encephalitis (EEE) virus that were well below that which were expected. A single horse was confirmed with EEE. Surveillance for West Nile Virus (WNV) provided numerous positive specimens of pooled and tested mosquitoes collected from all 21 counties. As a result of such activity one horse and five humans were confirmed as having contracted

the virus. Much of the response by the control agencies in the state was supported by this data and also that of the Statewide Adult Mosquito Surveillance Program, which appears elsewhere in this report.

Also successful this past fiscal year was the evaluation of the susceptibility of target mosquito species to the larval control formulations utilized by the State Airspray Program. Data produced by this program indicated consistent susceptibility to methoprene and temphos. This data is similar to that which was reported on in FY 2006.

During the past fiscal year, several changes in personnel who serve as commissioners occurred. Commission Chairman Dr. Leonard Spiegel who had retired last fiscal year left a vacancy for that post. Ms. Shereen Brynildsen served admirably as Chair Pro-tem until October when Dr. Kenneth W. Bruder was elected Chair. Mr. John Sarnas was elected Vice-Chair at that time as well.

The Month of June was one of great sadness as longtime Commission member Mr. Dave Adam, who served both as a designee for the State Department of Health and Senior Services, and upon retirement from state service, as a public member, passed away peacefully while at his home. Dave will be missed by all that knew and worked with him.

As the fiscal year drew to a close, fiscal matters consumed the attention of the commissioners. A proposed twenty percent reduction in the mosquito control, research, administration and operations appropriation, meant to aid in the state's attempt to balance the budget, caused the public members to reach out to the Legislature in order to ensure the stability of the state's mosquito programs. In addition, the members were faced with the consideration of how to maintain an economically feasible courier service to collect and deliver pooled specimens of mosquitoes requiring transport from all 21 counties to the Public Health Environmental Laboratory in Trenton, as the NJ Agricultural Experiment Station withdrew from that role.

Such challenges are not unfamiliar to veteran members of the state mosquito control community. Resolution to these matters will be reported on in subsequent annual reports.

## State Equipment-Use Program

The Equipment-Use Program annually assigns different types of surveillance, research or operational control equipment to any of 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'. The State Commission has in its inventory 119 pieces of equipment available to the mosquito control community through this program (Table 1.). During fiscal year 2007, all twenty-one county mosquito control agencies in New Jersey, 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 added six new pieces of equipment to its inventory in fiscal year 2007. A 60 hp Mercury outboard motor was purchased at a cost of \$5,915.00 and assigned to the Ocean County Mosquito Commission. This outboard motor replaced SMCC #66, a 1997 Mariner outboard motor that was irreparable, declared surplus, and disposed of. A ditching bucket was purchased to augment SMCC #6, the 2003 Kobelco low ground pressure hydraulic excavator assigned to the Warren County Mosquito Commission. The price of the bucket was \$1,481.25. SMCC #54, the 2002 Ford Ranger four wheel drive pickup truck, was equipped with a cap, at a cost of \$725.00. SMCC #70, the defunct 2000 Electramist ultra-low volume insecticide sprayer assigned to the Burlington County Division of Mosquito Control, was replaced with a Curtis Dyna-Jet L30 ULV machine, equipped with a Dyna-Trax GPS spray recording and vehicle monitoring system, at a cost of \$16,716.33. SMCC #73, the 2000 Electramist ULV machine assigned to the Atlantic County Office of Mosquito Control, was replaced with a London Fog XKE ULV machine equipped with a Monitor 4 spray recording and vehicle monitoring system. The cost of this ULV machine and accessories was \$11,850.00. Finally, SMCC #71, the 2000 Electramist ULV machine assigned to the Essex County Division of Mosquito Control, was replaced with a Clarke Cougar ULV machine equipped with a Data Master Gold Phase 2 spray recording and vehicle monitoring system. The cost of this final piece of equipment was \$15,405. The three Electramist ULV machines were declared surplus and disposed of.

In addition to these purchases made by the State Mosquito Control Commission, the Office of Mosquito Control Coordination again received funding from the Division of Fish and Wildlife's Office of Fish and Wildlife Health and Forensics for work relative to West Nile virus. The Commission endorsed using these funds to purchase two additional RAMP (Rapid Analyte Measurement Platform) test packages. The total cost for the two RAMP test packages was \$24,490.00. This equipment was assigned to the mosquito control agencies in Bergen and Cumberland Counties. Each test package consisted of an autoclave, a RAMP West Nile virus reader, a RAMP West Nile virus test kit (100 tests/kit), two vortex mixers, two mini centrifuges, various pipettes and pipette tips, centrifuge racks, biohazard containers, biohazard bags and absorbent bench liners. To date, ten of the twenty-one county mosquito control agencies have been provided with complete RAMP test packages purchased with Division of Fish and Wildlife funds.

During the fiscal year six pieces of equipment required repairs, at a total cost to the Commission of \$52,350.58. This included \$802.87 for repairs to SMCC #13, the SMCC MX808 low ground pressure hydraulic excavator assigned to the Atlantic County Office of Mosquito Control; \$3,425.86 to replace the brakes on SMCC #42, the Chevrolet C-60 flatbed truck assigned to the Sussex County Office of Mosquito Control; \$35,117.86 for repairs to SMCC #2, the amphibious rotary hydraulic excavator assigned to the Ocean County Mosquito Commission; \$2,737.80 for repairs to SMCC #61, the 20-ton trailer assigned to the Warren County Mosquito Commission; and \$6,998.73 for a counterweight retrofit to SMCC #7, the Kobelco low ground pressure hydraulic excavator assigned to the Salem County Mosquito Commission. The amount covered the cost of materials only in the counterweight retrofit; Salem County personnel performed the considerable amount of labor involved, thereby saving the State Mosquito Control Commission additional expense. \$3,267.46 was expended towards the counterweight retrofit to SMCC #6, the Kobelco low ground pressure hydraulic excavator assigned to the Warren County Mosquito Commission. The complete retrofit, including an additional counterweight, other related parts, and labor, will cost approximately \$16,000.00, and will be completed in fiscal year 2008.

Additionally, \$46,000.00 was encumbered for repairs to SMCC #10, the amphibious long-reach hydraulic excavator assigned to the Salem County Mosquito Commission. \$45,000.00 had been encumbered for repairs to this excavator in fiscal year 2006, which covered the parts needed for the repairs. Originally, Salem County Mosquito Commission personnel planned to perform the labor. It was determined that it would be more prudent to have this extensive work done by a qualified vendor, instead. The \$46,000.00 encumbered in fiscal year 2007 will cover the cost of labor. This work had not been completed by the end of the fiscal year.

Several pieces of equipment were surrendered during the fiscal year, and either transferred to other mosquito control agencies or disposed of, when warranted. SMCC #101, the Larvasonic SD2001 acoustic storm drain system, was transferred from the Office of Mosquito Control Coordination to the Sussex County Office of Mosquito Control, for field evaluation by that agency. The Warren County Mosquito Commission determined that it no longer had a need for SMCC #14 and 15, the Buffalo Truck all-terrain vehicle and trailer, and surrendered these two pieces of equipment. These were subsequently requested by, and transferred to, the Ocean County Mosquito Commission for use in their extensive water management program. Likewise, the Somerset County Department of Public Works, Mosquito Section determined that they no longer had a need for SMCC #28, the Vectec ULV machine, and SMCC #125, the Revco ultra low temperature freezer, and surrendered both. This equipment had not been transferred to another mosquito control agency by the close of the fiscal year. SMCC # 54, the Ford Ranger four wheel drive pickup truck, was temporarily transferred to the New Jersey Agricultural Experiment Station, for use in the State Mosquito Control Commission-funded Vector Surveillance Program.

The New Jersey Agricultural Experiment Station surrendered SMCC #40, the 1988 Dynatech microplate reader, washer, and printer. The State Commission had provided the NJAES with an upgraded Enzyme-Linked Immunosorbent Assay (ELISA) microplate reader and an ELISA microplate washer in fiscal year 2003, for use in encephalitis virus isolation work. The 1988 microplate reader and washer have since become obsolete; thus, their surrender by the NJAES. They have been declared surplus and disposed of.

The NJAES surrendered SMCC #34A, 34B, and 34C, the 1981 Zeiss phase contrast microscope, camera, and power transformer. This equipment was then requested by, and transferred to the Hudson Regional Health Commission, Mosquito and Vector Control Program. The NJAES also surrendered SMCC #43 and #54, both 2002 Ford Ranger pickup trucks. The Experiment Station determined that they would no longer provide the West Nile virus courier service, which entailed picking up mosquito samples from the twenty-one county mosquito control agencies and transporting them to the Department of Health and Senior Service's Public Health and Environmental Laboratory in Trenton for West Nile virus testing. Fortunately, the State Mosquito Control Commission was able enter into Memoranda of Agreement with the Atlantic County Office of Mosquito Control and the Morris County Mosquito Commission to continue this valuable service. SMCC #43 was subsequently transferred to Morris County to serve as a courier vehicle, and SMCC #54 was transferred to Atlantic County for the same purpose.

Finally, the 1985 Smalley 808 low ground pressure hydraulic excavator, and two 1966 Gorman-Rupp 6-inch water pumps were declared surplus and disposed of during fiscal year 2007.

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

**Table 1. State Mosquito Control Commission Equipment**

<b>No.</b>	<b>Type of Equipment</b>	<b>Location</b>
1	1992 Amphibious Hydraulic Rotary Excavator	Cape May
2	1987 Amphibious Hydraulic Rotary Excavator	Ocean
3	1995 Amphibious Hydraulic Rotary Excavator	Atlantic
4		Vacant
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	1987 13 Foot Boat	Burlington
22	1987 Boat Trailer	Burlington
23	2002 Outboard Motor	Burlington
24	1988 Stereo Microscope w/optics	Warren
25		Vacant
26		Vacant
27	1994 Ultra Low Temperature Freezer	Rutgers
28	1995 U.L.V. Machine	Somerset
29	1995 U.L.V. Machine	Salem
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	Salem
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 Pickup Truck w/Cap	Morris
44	1986 Excavator 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	2004 Tabletop Autoclave	Hunterdon
52	1984 Stereo Microscope	Monmouth
53		Vacant
54	2002 4WD Pickup Truck w/Cap	Atlantic
55	1985 Hydraulic Excavator	Essex
56	6" Water Pump	Cape May
57	1989 Stereo Microscope	Atlantic
58	1989 All-Terrain 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	2000 U.L.V. Machine	Hunterdon
70		Vacant
71		Vacant
72	2000 U.L.V. Machine	Warren
73	2000 U.L.V. Machine	Atlantic
74		Vacant
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 4WD Pickup Truck w/Cap	State
90	2002 17 Foot Boat	Essex
91	2002 Outboard Motor	Essex
92	2002 Boat Trailer	Essex
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 4WD 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	2002 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	2003 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	Somerset
126	2004 Ultra Low Temperature Freezer	Union
127	2004 Ultra Low Temperature Freezer	Hudson

## State Mosquito Airspray Program

Fiscal year 2007 began, as in all years past, with the mosquito control season well underway. Warm, dry conditions characterized the latter half of the calendar 2006 mosquito season, with a corresponding reduction in the Airspray Program's activity level. Climatic conditions during the early portion of the calendar 2007 season were also drier than normal, again reducing mosquito production. As a result, only 23 insecticide applications were made in 6 counties during fiscal year 2007, treating a total of 32,593 acres (Table 2). This compares to 39 applications made in fiscal year 2006 that encompassed 59,359 acres, and 73,812 acres treated during 48 aerial applications in fiscal year 2005.

Remarkably, all aerial applications conducted during the fiscal year were for the control of larval mosquitoes. For the first time since its inception in 1949, the State Airspray Program performed no aerial adulticide operations. The majority of these larvicide applications (74%) were made to the Atlantic Coastal salt marshes and the Delaware Bayshore salt hay farms, where mosquito production is predominantly influenced by monthly tidal cycles. In upland habitats, precipitation is the main factor affecting the level of mosquito production.

The insecticides used in these larvicide applications were temephos (5% granular formulation), methoprene (20% liquid formulation), and various formulations of *Bacillus thuringiensis* var. *israelensis* (Bti). Following several years of problems encountered with the efficacy of methoprene in controlling salt marsh mosquitoes within the Atlantic coastal region, the decision was made to use an aqueous suspension formulation of Bti as the sole larvicide used in Atlantic County applications during the fiscal year, with good results. Methoprene continued to yield satisfactory control in applications made to the salt hay farms along the Delaware Bay.

In addition to aerial larviciding, program aircraft were also utilized for the surveillance of mosquito production habitat in Morris County.

Aircraft available to the program included single-engine Grumman "Ag Cats" and a Mielec "Dromader" for high payload applications; Cessna "Skylanes" for observation and survey work; Bell "Jet Ranger" rotary-wing aircraft for survey work and insecticide applications; and a twin-engine Beechcraft "King Air" for high speed ultra low volume insecticide applications. While available, the latter was not used during the fiscal year because no aerial adulticide applications were performed.

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. During the last fiscal year, in-kind reimbursement was also made in advance, for anticipated applications made during the calendar 2006 mosquito season. Numbers were arrived at based on a four-year average of state-owned acreage treated. However, the calendar 2006 mosquito season was quite warm and dry, with reduced mosquito production. The advance in-kind reimbursement was sufficient to cover

applications made to state-owned land for the latter half of fiscal year 2006 as well as all of fiscal year 2007. Consequently, additional in-kind reimbursement was not necessary for this fiscal year.

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

**Table 2. State Airspray Program acreage treated in FY2007 by mode and county.**

County	Larviciding Acreage	Adulticiding Acreage	Total Acreage
Atlantic	19,451	- 0 -	19,451
Camden	50	- 0 -	50
Cape May	1,953	- 0 -	1,953*
Cumberland	7,210	- 0 -	7,210
Essex	2,690	- 0 -	2,690
Morris	2,660	- 0 -	2,660
Ocean	3,575	- 0 -	3,575*
<b>State Total</b>	<b>32,593</b>	<b>0</b>	<b>32,593</b>

\*State reimbursed insecticides applied by county aircraft to state-owned land. Not included as part of Airspray Program total acreage as applied by State aircraft.

## Biological Control Program

The State Mosquito Control Commission, upholding its integrated pest management approach to mosquito control, continued support of the Biological Control Program during fiscal year 2007. Mosquito-eating fish were again made available to New Jersey's county mosquito control agencies and commissions for use in their programs.

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, difficulties with overwintering *Gambusia affinis* were encountered during this fiscal year. Specifically, approximately 300,000 *Gambusia* were brought indoors at the hatchery during the fall of 2006 for overwintering. An inexplicable, and very large, die-off occurred late in the winter, leaving only approximately 50,000 *Gambusia* alive. As a result, very few *Gambusia* were available for distribution to the county mosquito control agencies during the spring and early summer of 2007, as most of the remaining fish were needed to seed the outdoor ponds. The cause of mortality is still under investigation, with the hope that this problem can be resolved.

These recent difficulties notwithstanding, the Bureau of Freshwater Fisheries continues to provide invaluable assistance to the Office of Mosquito Control Coordination and the using 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 159,410 fish were stocked through the Biological Control Program in fiscal year 2007, in twelve counties in New Jersey (Table 3). Species stocked included the Mosquitofish, *Gambusia affinis*, and the Fathead Minnow, *Pimephales promelas*. Since its inception in 1992 a total of 2,503,427 fish have been provided to the counties for mosquito control purposes through the Commission's Biological Control Program.

The cyclopoid copepod project, begun in fiscal year 2005, continued in fiscal year 2007. The Commission renewed its Memorandum of Agreement with the New Jersey Department of Agriculture, the goals of which were to continue to search for native copepod species thought to have potential as mosquito control agents; to determine their identification and to establish them in laboratory culture; to develop a method for safely transporting copepods from laboratory to the field and for efficiently releasing them; to integrate the practices of producing, transporting and releasing copepods; and to observe the response of lab-reared copepods when released. These goals have been substantially met.

The Phillip Alampi Beneficial Insect Laboratory has in culture *Macrocyclus albidus* and *Acanthocyclops vernalis*, two species used in other successful mosquito control programs in the United States. By mid-summer of 2006, personnel at the laboratory had devised a technique for dispensing known numbers of copepods onto units of sphagnum moss, which when carried in

insulated containers, could be transported with 100% survival of the copepods. Kept moist and cool, the same units could be stored for up to four weeks, with at least 60% of the copepods surviving. Releases of known numbers of copepods were easily made by floating these copepod-sphagnum moss units in mosquito larval habitats.

Limited field trials with *M. albidus* were conducted for eight weeks in test sites of abandoned tires in Hunterdon, Mercer, Monmouth and Morris Counties, commencing in August of 2006. Control and copepod-inoculated tires were inspected weekly by personnel from the four county mosquito control agencies. By the close of the study in October, it was apparent that units of copepod-saturated sphagnum moss were an efficient, effective way to transport copepods and inoculate field sites. It was also observed that, even with the study's late start and short duration, *M. albidus* established readily detectable populations in tires in at least three of the four counties, and gave indications of having suppressed mosquito production in the tires.

Although the objective of this field exercise was to test procedure, rather than evaluate mosquito control, results suggesting a suppression of mosquito production in tires containing *M. albidus* were quite promising. In 2007, this procedure of releasing *M. albidus* in the tire test sites was repeated in Hunterdon, Monmouth and Morris Counties. Copepod releases were made in early June, and data collection monitored copepod and mosquito population trends throughout the mosquito season.

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

**Table 3. Mosquitofish stocking by county and species during FY 2007**

<b>County</b>	<b>Species</b>	<b>Number of Fish</b>
<b>Bergen</b>	Fathead minnows	20,000
<b>Burlington</b>	Fathead minnows	1,000
<b>Camden</b>	Fathead minnows	600
	<i>Gambusia</i>	6,000
<b>Essex</b>	<i>Gambusia</i>	13,850
<b>Gloucester</b>	Fathead minnows	8,150
	<i>Gambusia</i>	3,100
<b>Mercer</b>	<i>Gambusia</i>	10,000
<b>Monmouth</b>	<i>Gambusia</i>	10,000
<b>Morris</b>	<i>Gambusia</i>	5,000
<b>Ocean</b>	Fathead minnows	15,000
	<i>Gambusia</i>	40,500
<b>Salem</b>	Fathead minnows	4,600
<b>Sussex</b>	Fathead minnows	8,800
	<i>Gambusia</i>	9,910
<b>Union</b>	Fathead minnows	2,900
<b>Total</b>		159,410

## **Monitoring the Efficacy of Insecticides for Mosquito Control in New Jersey**

### **Collection.**

Host-seeking *Aedes sollicitans* females were collected as before from four locations in southern New Jersey: West Creek in Ocean County, Leeds' Point in Atlantic County, Sutton Lane (Dennis) in Cape May County, and Heislerville (East Point Lighthouse) in Cumberland County. Collections were made between May and October 2006. The last collecting trip in 2006 was on October 22, record late for *Ae. sollicitans* to still be flying in New Jersey. The females were brought to the New Brunswick lab and fed cattle blood (purchased from the Carteret Abattoir) with a Hemotek apparatus. They were transferred to glass shell vials (2 females per vial) equipped with a moistened cotton ball and sealed with a piece of fabric screen (bridal veil) through which they could take further blood meals, if needed. 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 at 24°C+/-2°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.

### **Obtaining the mosquito larvae.**

The eggs were allowed to dry for at least three weeks, and when needed, hatching was accomplished by adding clean water to the vial and depleting the dissolved oxygen by applying a vacuum. This accomplished a more synchronized hatching, but no apparent increase in hatching. The larvae were raised on ground rat chow (Purina) in fresh water.

The water was kept at 24°C and cleaned by toweling the surface each day before feeding. Only uniformly sized 4<sup>th</sup> instar larvae were selected for the experiments.

### **In vivo toxicity 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. 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 were used; each beaker had 100 mL of pure, fresh water, 10 mosquito larvae, and  $\mu$ L quantities of temephos solutions. Last (4<sup>th</sup>) instar larvae were used for all experiments. Temephos toxicity (dead larvae) was assessed 24 hours after application.

The methoprene toxicity test was done according to A. Ali, J.K. Nayar and R.D. Xue, 199: (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: set-up of 14 (six methoprene and a control, all in duplicate) 250 mL glass beakers inside plastic mosquito breeding cages. Each beaker contained 100 mL of pure fresh water, 10 4<sup>th</sup> instar mosquito larvae, and ground rat chow. The test beakers also contained a range of concentrations of methoprene dissolved in 20 µL or less of acetone. When all larvae in the control beaker had emerged as adults, the experiment was terminated and adults emerged in all beakers were counted. The fourth instar larvae were selected to be early to midways through the fourth instar.

The toxicity data for temephos and methoprene against larvae from females collected in 2006 are summarized in Table 4. These data are based on bioassays from the entire year and generated with the PoloPlus® Software.

**Table 4. LC<sub>50</sub> data for temephos and methoprene to 4<sup>th</sup> instar larvae of *Ae. sollicitans* in 2006 (95% lower - upper confidence limits of the LC<sub>50</sub> value).**

County	Temephos (ppb)	Methoprene (ppb)
<b>Ocean</b>	6.7 (5.7 - 7.8)	35.4 (25.2 - 48.9)
<b>Atlantic</b>	7.6 (5.8 - 9.6)	11.3 (7.7 - 17.4)
<b>Cape May</b>	3.4 (2.8 - 3.9)	6.8 (4.6 - 10.3)
<b>Cumberland</b>	4.3 (3.9 - 4.8)	2.0 (0.7 - 4.5)*

The larvae from Cumberland County responded inconsistently to methoprene this year.

The data for the past eight years are summarized in Table 5 for temephos and Table 6 for methoprene.

**Table 5. Eight-year summary of LC<sub>50</sub> data for temephos (ppb)**

Location	1999	2000	2001	2002	2003	2004	2005	2006
<b>Ocean</b>	32	24	10	16	27	28	6.3	6.7
<b>Atlantic</b>	22	16	10	11	4	16	4.5	7.6
<b>Cape May</b>	7	8	7	7	4	8	3.3	3.4
<b>Cumberland</b>	-	10	11	8	5	7	3.7	4.3

**Table 6. Eight-year summary of LC<sub>50</sub> data for methoprene (ppb)**

Location	1999	2000	2001	2002	2003	2004	2005*	2006
Ocean	-	10	14	13	19	12	1	35.4
Atlantic	5	7	8	7	258	54	3	11.3

Cape May	-	-	12	10	5	1	5	6.8
Cumberland	-	-	10	-	1	2	2	2

Compared to data from 2005, temephos toxicities remain remarkably similar. Mosquito larvae from Cumberland County and Cape May County have been consistently more susceptible to temephos over the eight years of this study. The toxicities of methoprene to larvae from all four counties are considerably more variable than those of temephos over the years. The data show that the toxicities of both larvicides to larvae from females collected in all four southern New Jersey counties are susceptible and perfectly controllable with low doses of temephos and methoprene. Barring major changes in spray schedules, these mosquitoes can be expected to remain susceptible and controllable for the near future.

Project Director: Dr. Lena Brattsten  
Rutgers University

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

## **Introduction**

The NJ 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 the 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. EEE virus tests have been conducted by the NJ State Department of Health laboratories in Trenton since the program was conceived. During the early years of the study, Rutgers was able to conduct all of the field investigations in the southern half of the state. The inclusion of WNV, however, required statewide surveillance of mosquito populations to adequately follow the seasonal progression of virus activity in potential mosquito vectors. County mosquito control personnel were recruited to collect and process specimens after WNV appeared. The program now functions as a cooperative effort that includes the NJ Department of Environmental Protection, the NJ Department of Health and Senior Services, the NJ 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 with information to target vector populations for the prevention of human disease. This report documents the results of virus surveillance efforts during the 2006 encephalitis season.

## **Methodology for 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 bird feeding 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* are made from resting boxes at permanent study sites by a team of field staff from Rutgers. The mosquitoes are frozen on dry ice at the collection site and transported to Headlee Research Labs at Rutgers for further processing. The frozen specimens are sorted on a chill table to maintain the cold chain and are identified to species, pooled by stage of blood meal digestion and submitted weekly to the PHEL facility in Trenton for virus tests. Positive pools are detected by Taqman RT-PCR. Information from the investigation is summarized and distributed weekly to mosquito control agencies in New Jersey. The resting box collection sites for 2006 included: Turkey Swamp in Monmouth Co., Green Bank in Burlington Co., Corbin City in Atlantic Co., Dennisville in Cape May Co., Waterford in Camden Co., and Centerton in Salem Co.

## **Results for EEE Surveillance in 2006**

As with the previous year, the 2006 vector surveillance season began with lower than normal levels of *Culiseta melanura*, suggesting the probability of limited virus activity for most of the year. In most years, EEE appears in New Jersey long before it is detected in states to the north. As in 2005, however, EEE was not detected at New Jersey study sites until well after virus activity had been detected in surrounding states including those to the north. Massachusetts found their first positive pool on July 4<sup>th</sup> while the single New Jersey positive pool was found about seven weeks later.

This single positive pool of *Cs. melanura* collected from Green Bank came from a population that was well below historical trends. The Mullica River drainage, site for this monitoring area, has traditionally been a primary focus for early season EEE activity. Veterinary activity was limited to a single confirmed horse case reported 8 days after the positive pool was detected and was less than 10 miles away. This was a 6-year old mare whose onset of symptoms began 6 September. No bridge vectors were found positive. It is likely that the drought conditions experienced during August attenuated both the enzootic and bridge vectors, limiting the extent of EEE activity in New Jersey for 2006.

Table 7 lists the total number of mosquitoes tested for EEE by site in 2006, together with positives and earliest isolation dates. EEE was eventually confirmed from 1 (Green Bank) of the 6 sites in the monitoring network.

**Table 7.** Resting box populations of *Culiseta melanura* tested for EEE in New Jersey during 2006.

<b>SITE</b>	<b>TOTAL TESTED</b>	<b>NO. POOLS</b>	<b>NO. EEE POSITIVES</b>	<b>EARLIEST POSITIVE</b>
<u>Coastal Sites</u>				
Green Bank	733	65	1	August 29
Corbin City	395	65	0	-
Dennisville	1,916	80	0	-
<u>Inland Sites</u>				
Waterford	186	33	0	-
Centerton	960	66	0	-
Turkey Swamp	497	63	0	-
<b>TOTALS</b>	<b>4,687</b>	<b>372</b>	<b>1</b>	

#### **Methodology for WNV Surveillance**

New Jersey's WNV surveillance program in 2006 continued to rely on a significant county initiative to conduct meaningful surveillance throughout the state. Most county programs focused their trapping efforts in areas where prior surveillance data pointed toward high WNV activity. The Rutgers program used gravid traps and CO<sub>2</sub> 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 asked for assistance. The NJ State Mosquito Control Commission provided Rutgers with a vehicle for weekly courier service to assure that specimens were delivered to the PHEL labs in Trenton for rapid turnover of results.

### **Results for WNV Surveillance in 2006**

During the 2006 mosquito season, a total of 122,521 specimens were tested in 5,229 pools. Results from the surveillance effort produced 252 WNV positive pools. All of New Jersey's 21 county mosquito control agencies participated in the state program in 2006. Table 8 combines collections made by Rutgers personnel with those collected and processed at agency facilities and lists totals by county.

**Table 8.** Mosquitoes tested for West Nile in New Jersey during 2006.

<b>County</b>	<b>No. Pools Submitted</b>	<b>Total Mosquitoes for the Year</b>	<b>No. Positive Pools</b>
Atlantic	293	5,522	<b>0</b>
Bergen	520	26,349	<b>62</b>
Burlington	224	1,630	<b>2</b>
Camden	149	1,896	<b>3</b>
Cape May	242	5,482	<b>1</b>
Cumberland	169	1,056	<b>0</b>
Essex	100	1,870	<b>6</b>
Gloucester	248	2,670	<b>2</b>
Hudson	282	10,301	<b>50</b>
Hunterdon	276	9,124	<b>15</b>
Mercer	369	5,522	<b>35</b>
Middlesex	239	8,123	<b>23</b>
Monmouth	334	2,570	<b>2</b>
Morris	168	2,656	<b>5</b>
Ocean	210	2,144	<b>1</b>
Passaic	119	3,488	<b>13</b>
Salem	217	2,125	<b>1</b>
Somerset	175	4,257	<b>7</b>
Sussex	463	13,886	<b>3</b>
Union	81	2,041	<b>17</b>
Warren	351	9,809	<b>4</b>
<b>TOTAL</b>	<b>5,229</b>	<b>122,521</b>	<b>252</b>

Table 9 lists WNV infection rates in the mosquitoes that were tested in 2006. Infection rates in both amplification vectors and bridge vectors have tended to decline over the past several years. In 2004, WNV was limited to bird feeding mosquitoes with no evidence of transfer to any of the bridge vector species that tested positive in prior years. In 2005, single positives were obtained from 4 known mammal biters including: *Aedes vexans*, *Anopheles quadrimaculatus*, *Aedes japonicus* and *Aedes triseriatus*. This year, infectious bridge vectors were limited to *Aedes albopictus* and *Aedes japonicus*. As expected, Minimum Field Infections Rates (MFIR) was highest in bird feeding mosquitoes. *Culex pipiens* had the highest MFIR (5.13 positives per 1000 tested) emphasizing that this mosquito continues to function as the primary amplification vector in our region. *Culex restuans* and *Culiseta melanura* had infection rates of 2.70 and 0.2 per thousand, respectively, re-emphasizing that those 2 bird feeding mosquito species are secondary vectors in the WNV transmission cycle.

**Table 9.** WNV Infection Rates in New Jersey Mosquitoes during 2006.

Species	Total Tested	Positive Pools	2006 MFIR	MFIR Last Year
Primary Amplification Vectors				
<i>Cx. pipiens</i>	10,910	56	5.13	4.5
<i>Cx. spp.</i>	74,334	184	2.48	2.9
<i>Cx. restuans</i>	2,958	8	2.70	2.5
<i>Cs. melanura</i>	4,982	1	0.20	0.1
<i>Or. signifera</i>	7			
Potential Bridge Vectors				
<i>Ae. albopictus</i>	3,220	2	0.62	
<i>Ae. atlanticus</i>	374			
<i>Ae. atropalpus</i>	2			
<i>Ae. canadensis</i>	358			
<i>Ae. cantator</i>	265			
<i>Ae. cinereus</i>	3			
<i>Ae. japonicus</i>	1,519	1	0.66	0.4
<i>Ae. punctor</i>	2			
<i>Ae. sollicitans</i>	548			
<i>Ae. sticticus</i>	581			
<i>Ae. stimulans</i>	3			

<i>Ae. taeniorhynchus</i>	176			
<i>Ae. triseriatus</i>	506			1.0
<i>Ae. trivittatus</i>	2,792			
<i>Ae. vexans</i>	5,661			0.4
<i>An. barberi</i>	4			
<i>An. bradleyi</i>	572			
<i>An. crucians</i>	1			
<i>An. punctipennis</i>	370			
<i>An. quadrimaculatus</i>	2,987			0.4
<i>An. walkeri</i>	30			
<i>Cq. perturbans</i>	254			
<i>Cx. erraticus</i>	1098			
<i>Cx. salinarius</i>	6,199			
<i>Cx. territans</i>	109			
<i>Ps. ciliata</i>	17			
<i>Ps. columbiae</i>	444			
<i>Ps. ferox</i>	762			
<i>Ps. howardii</i>	5			
<i>Ur. sapphirina</i>	469			

### **Horse and Human Involvement**

During 2006, there was one equine case that occurred in Middlesex County with onset of symptoms on September 6th. Five human cases occurred in the Suburban Corridor between the major metropolitan regions. The cases occurred in Union County with onset of symptoms on August 4<sup>th</sup>, in Essex County (August 13<sup>th</sup>), in Bergen County (August 19<sup>th</sup>), in Middlesex County (August 25<sup>th</sup>) and again in Bergen County (September 2<sup>nd</sup>). The distribution of cases was in areas of New Jersey that experienced the highest mosquito infection rates.

### **Conclusions**

Continuing drought conditions throughout most of NJ, particularly during August, limited bridge vector populations for most of the summer and directly impacted the progression of both EEE and WNV during the 2006 mosquito season. EEE virus was active throughout much of New England but did not appear in NJ until late in August. Despite the low population of both *Cs. melanura* and potential bridge vectors, one horse case did occur. All of New Jersey's 21 county mosquito control agencies collected and processed

specimens for the WNV surveillance initiative. WNV was largely limited to bird feeding mosquitoes in 2006. Fewer mosquito species were involved this year as compared to the previous year. Positive mosquitoes involved beyond the amplification cycle included only 2 pools of *Ae. albopictus* and a single pool of *Ae. japonicus*.

Project Director: Dr. Lisa Reed, Rutgers University

## NEW JERSEY STATE SURVEILLANCE

Final Weekly Report for 2006

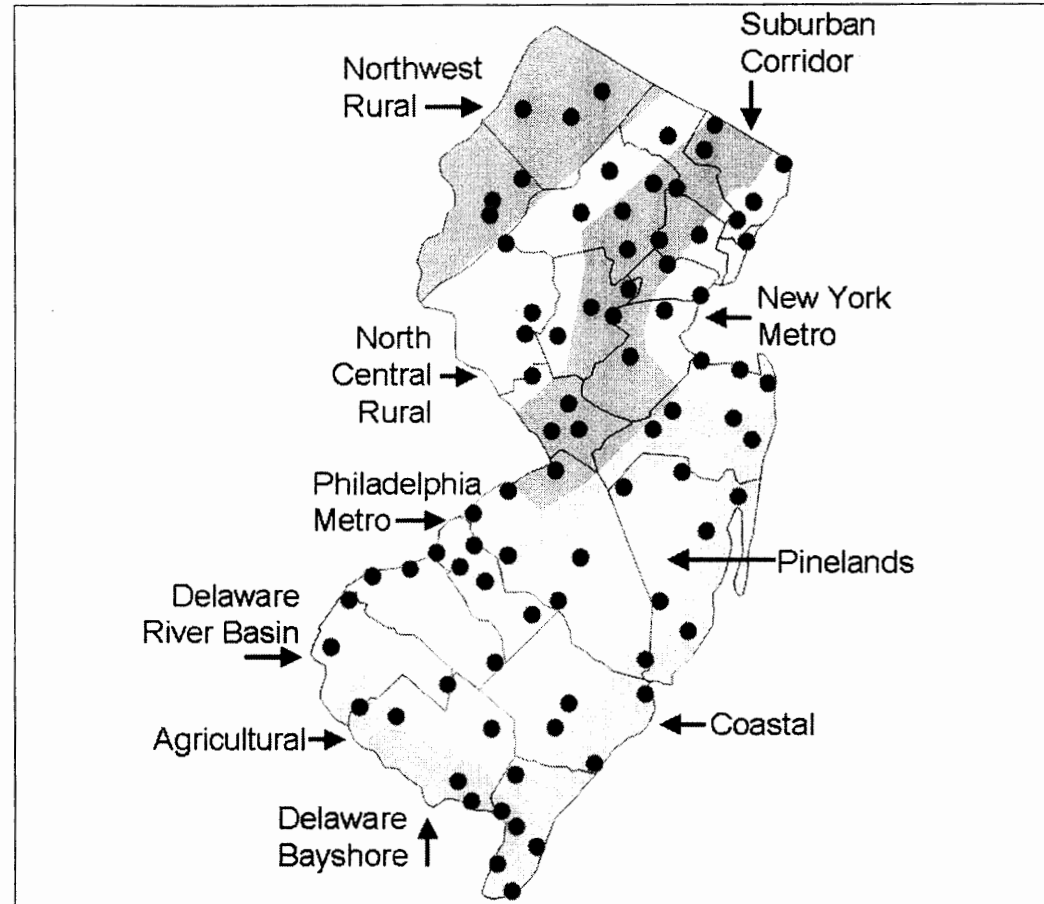
**Purpose:** Data from 84 New Jersey light traps contributed by county mosquito control agencies are used to calculate trends in mosquito populations for species of nuisance or health concerns.

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 view of changing mosquito trends is not 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 2006 Season:** Twenty of the 21 county mosquito agencies participated in this program. Most agencies provided data in a timely matter. However, at times, most agencies were occasionally pressed to get the data to Headlee Labs. 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.



During 2004, a total of 42 species in 330,000 individuals were caught in the light traps throughout New Jersey. In 2005, after a cold spring and dry summer, only 220,910 mosquitoes from 35 species were recorded in the same light traps. This year, we also experienced a cooler than normal spring with a drought during August and the values were even lower than 2005: a total of 196,411 mosquito specimens were caught comprising 35 different species. Additionally, patterns were similar to last with regard to the number of species found in each region. The least species-diverse region was the Delaware River Basin, typified by floodwater and saltmarsh mosquitoes that exploit the habitat created within dredge spoils. The Pinelands continue to be the richest in species abundance with the Coastal and Suburban regions also being also abundant in the number of species found.

<i>Region</i>	<i>Number of Traps</i>	<i>Number of Species</i>
Agricultural	6	27
Coastal	9	31
Delaware Bayshore	6	21
Delaware River Basin	4	17
New York Metro	10	29
North Central Rural	8	21
Northwestern Rural	7	24
Philadelphia Metro	6	25
Pinelands	11	32
Suburban	17	30
<b>Total</b>	<b>84</b>	<b>35</b>

Historical data was entered for all regions as a running mean encompassing the previous five years. For some regions, historical data is based on as few as 3 traps. This paucity of data will decrease as the current dataset becomes incorporated into the historical dataset. Historical data is represented by a solid red line, plotted with error bars, against the black bars of the current year's dataset.

**Mosquito Species Collected in 2006:** The mosquitoes collected in county operated light traps belong to a series of very different life cycle types as described by Crans (2004). We present the seasonal data for the 26 species from last year's report in the following life cycle types:

**Univoltine *Aedine (stimulans/canadensis)* Species:** Members that belong to this group overwinter as eggs and have a single generation in early spring. The eggs hatch when water temperatures are still quite cold and the adults are usually on the wing during the month of May. In most species, the eggs laid in May and June enter diapause and do not hatch until they are flooded the following year. Some of the members in this group have a generation that reappears in the fall. Most biologists feel that these are eggs that did not hatch during the spring flooding and were left behind as survival insurance. Mosquito species collected in light traps that belong to this group include: *Ae. stimulans*, *Ae. canadensis*, *Ae. sticticus* & *Ae. cinereus*.

**Multivoltine Aedine (*vexans*) Species:** Members of this group also overwinter as eggs but do not hatch until later in the season when water temperatures rise to ideal levels. These mosquitoes have multiple generations during the summer months that are regulated by flooding patterns. Each period of excessive rainfall produces a major brood. Minor floodings can generate overlapping broods that are usually localized. Mosquito species collected in light traps that belong to this group include: *Ae. vexans*, *Ae. trivittatus*, *Ps. ferox*, *Ps. columbiae*, *Ps. ciliata*

**Multivoltine Aedine (*sollicitans*) Species:** Members that belong to this group overwinter as eggs but lay them on tidal marshes where lunar tides provide a method to inundate the eggs. There are multiple generations during the summer months with as many as 2 broods each month from May to October. Rainfall can produce egg hatch which complicates the picture. As a result, biting populations can include mosquitoes of mixed age. Mosquito species collected in light traps that belong to this group include: *Ae. sollicitans* & *Ae. cantator*.

**Multivoltine Aedine (*triseriatus*) Species:** These mosquitoes glue their eggs to the sides of containers above the water line and rely on rains to raise the water level and hatch the eggs. Like other Aedines, they overwinter as eggs and reappear each spring when water temperatures begin to rise. Most members of the group are active during the day and are enter light traps in very low numbers. Mosquito species collected in light traps that belong to this group include: *Ae. triseriatus* & *Ae. japonicus*.

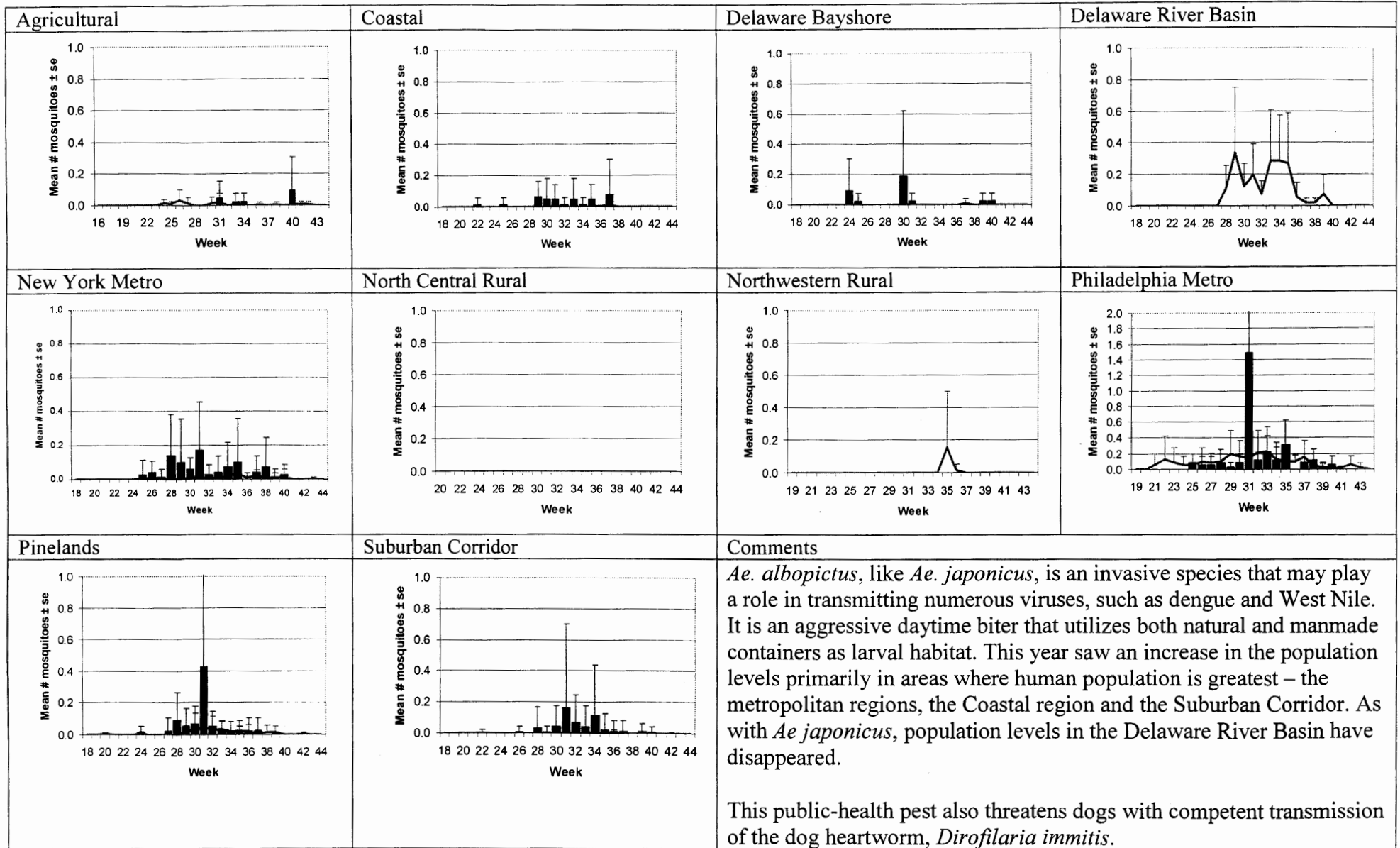
**Multivoltine Culex/Anopheline (*quadrifasciatus*) Species:** Members that belong to this group have a life cycle strategy that is very similar to the Multivoltine *Culex*. They overwinter as mated females and build their populations over the course of the summer. They are included as a separate group because they represent an entire genus. Mosquito species collected in light traps that belong to this group include: *An. quadrifasciatus*, *Cx. territans* & *Cx. erraticus*.

**Multivoltine Culex/Anopheline (*salinarius*) Species:** Members of this group overwinter as mated females that will lay eggs in a variety of brackish water, showing a wide degree of salt tolerance. Larvae generally reach highest numbers in brackish water and with multiple generations, the populations can build throughout the season. *An. bradleyi* is an example of this type. \*note\* *Culex salinarius* is grouped with the Culex Complex due to the difficulty in distinguishing this species with *Culex pipiens* and *Culex restuans*.

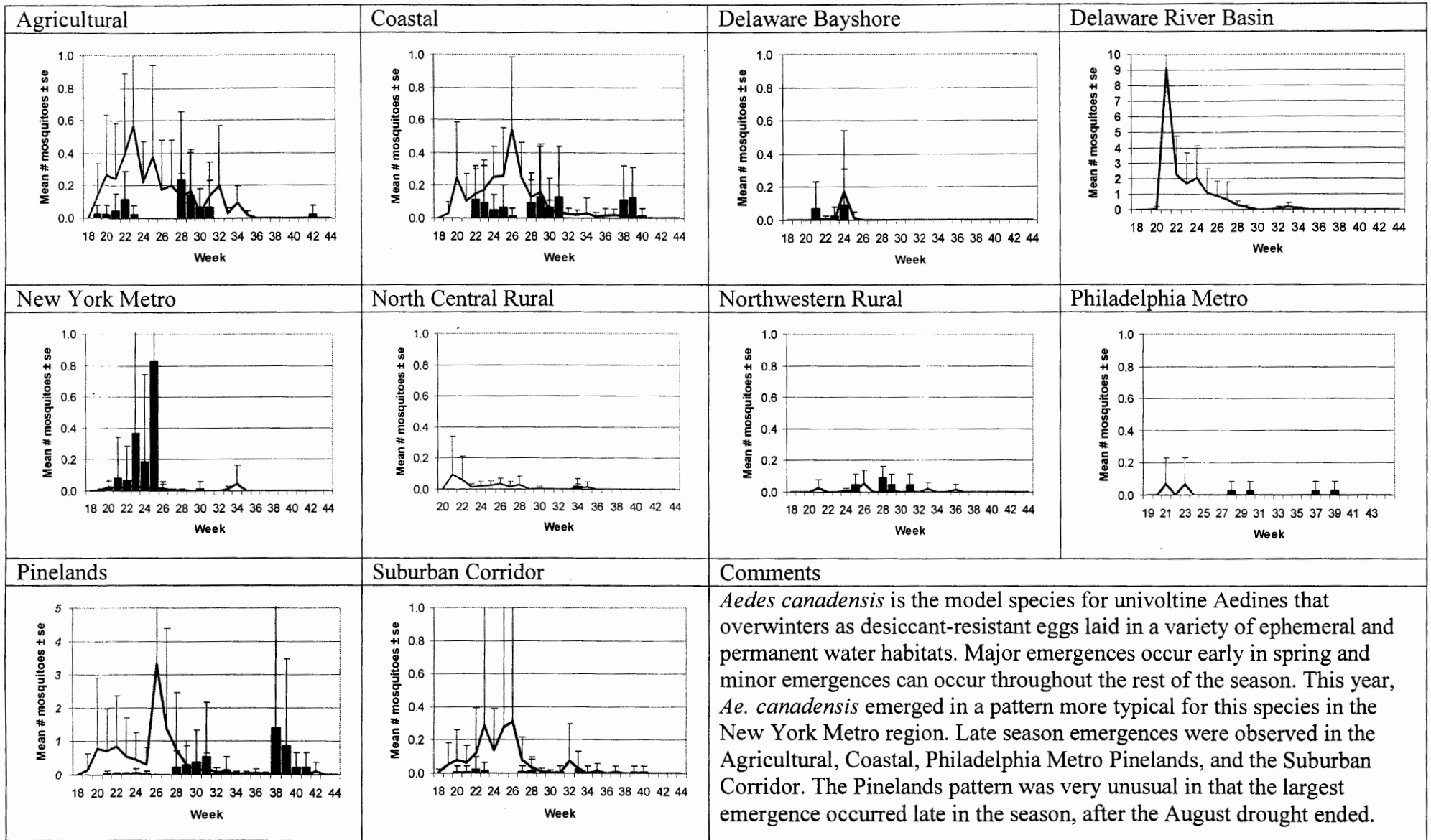
**Multivoltine Culex/Anopheline (*pipiens*) Species:** Members that belong to this group overwinter as mated females. Populations in early spring are represented by mosquitoes that survived the winter and the numbers are at relatively low levels. These mosquitoes cannot become active until night time temperatures enter the 60's, thus host seeking and oviposition is delayed until late May or June. The first generation of larvae takes time to develop and populations do not build until mid-summer at the earliest. As soon as night time temperatures begin to cool down, the mosquitoes mate, seek winter hibernaculae, enter diapause and hibernate. Only the females survive in this group. Males will not appear until the eggs hatch very late the following spring. Mosquito species collected in light traps that belong to this group include: The Culex Complex, *An. punctipennis*

**Miscellaneous Group:** The members in this group have little in common because each utilizes a unique life cycle strategy. The mosquito species collected in light traps that we have included in the group include: *Cq. perturbans*, *Cs. melanura* & *An. walkeri*.

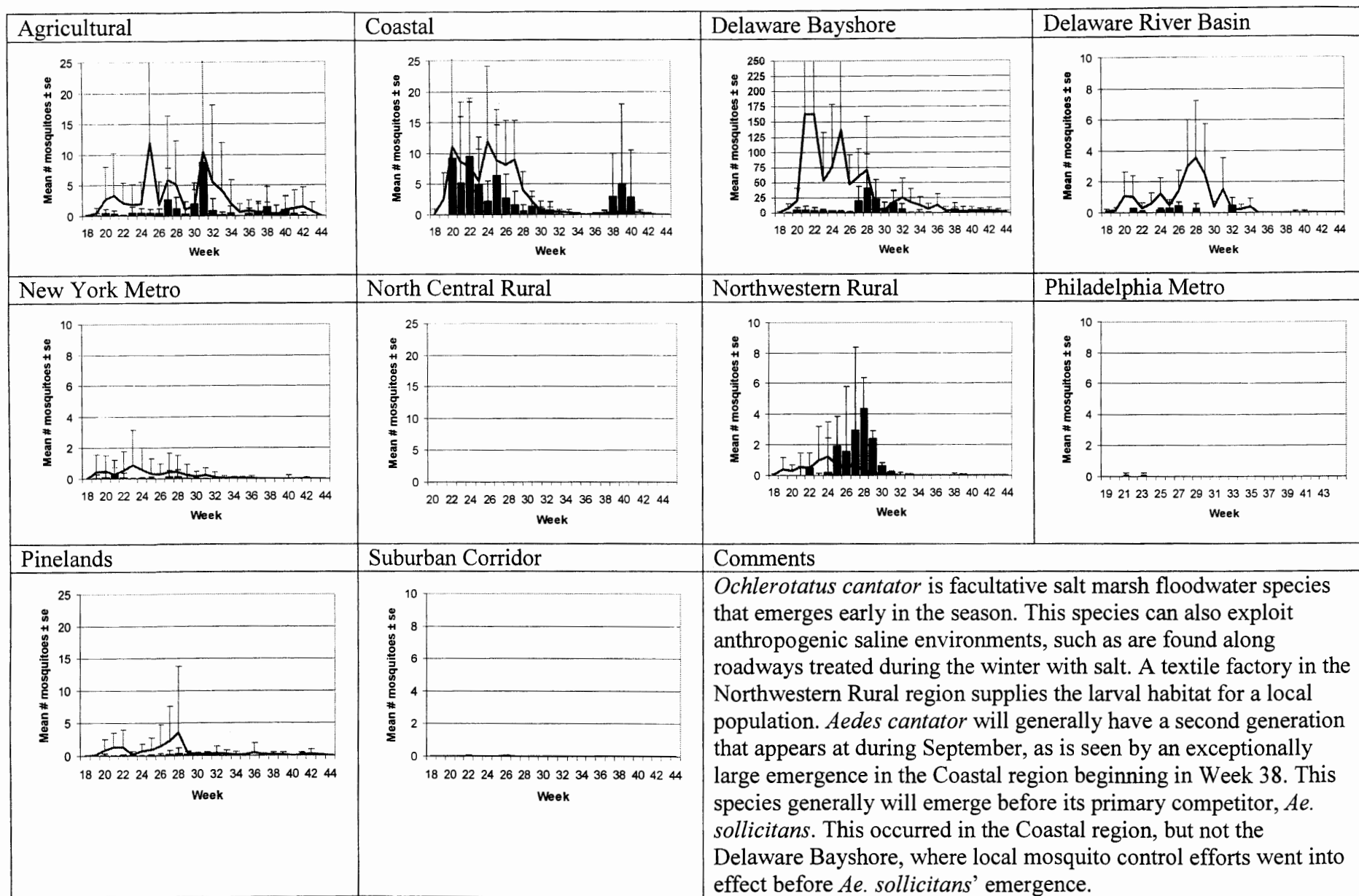
## *Aedes albopictus* – Multivoltine Aedine, *triseriatus* Type



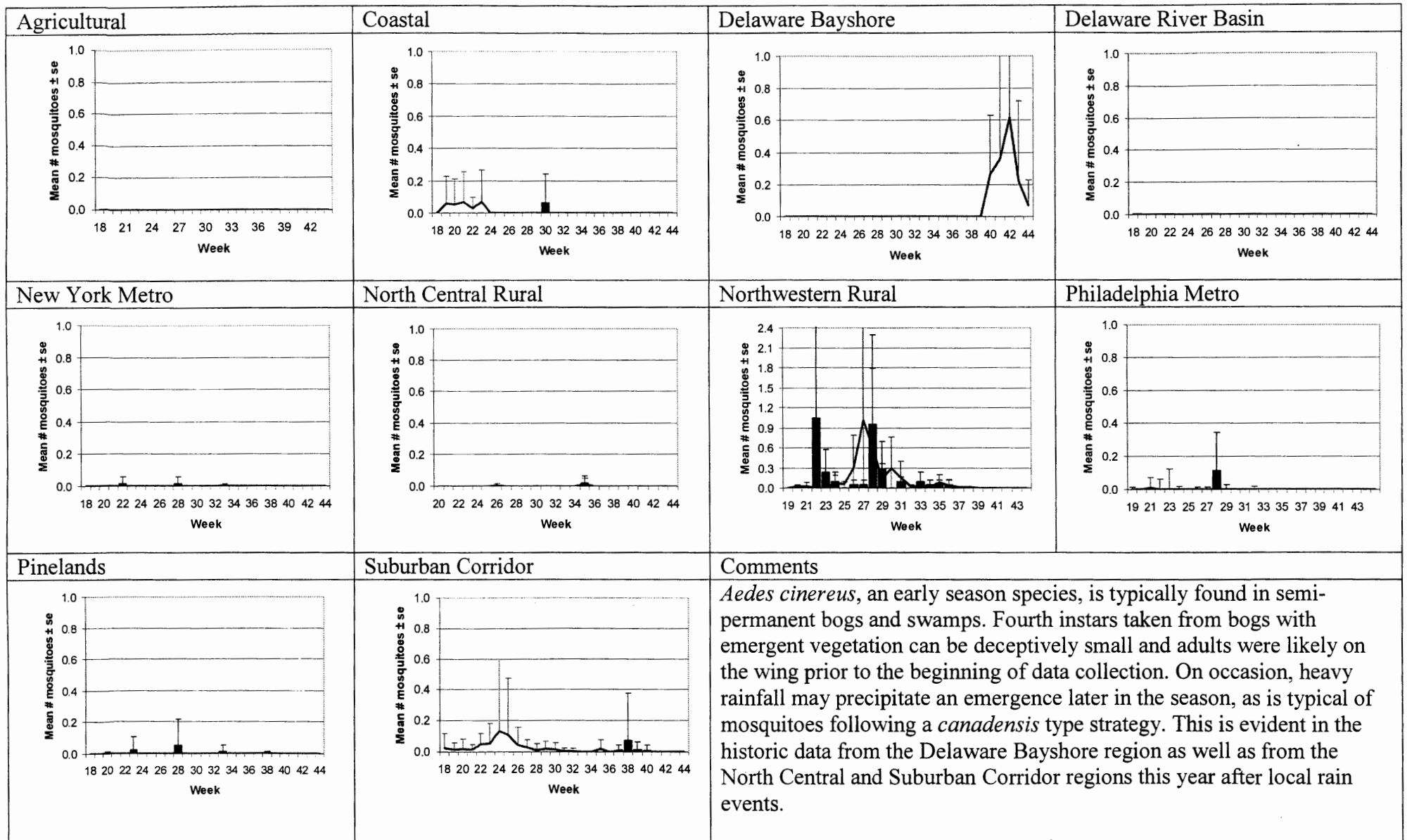
# *Aedes canadensis* - Univoltine Aedine, *canadensis* Type



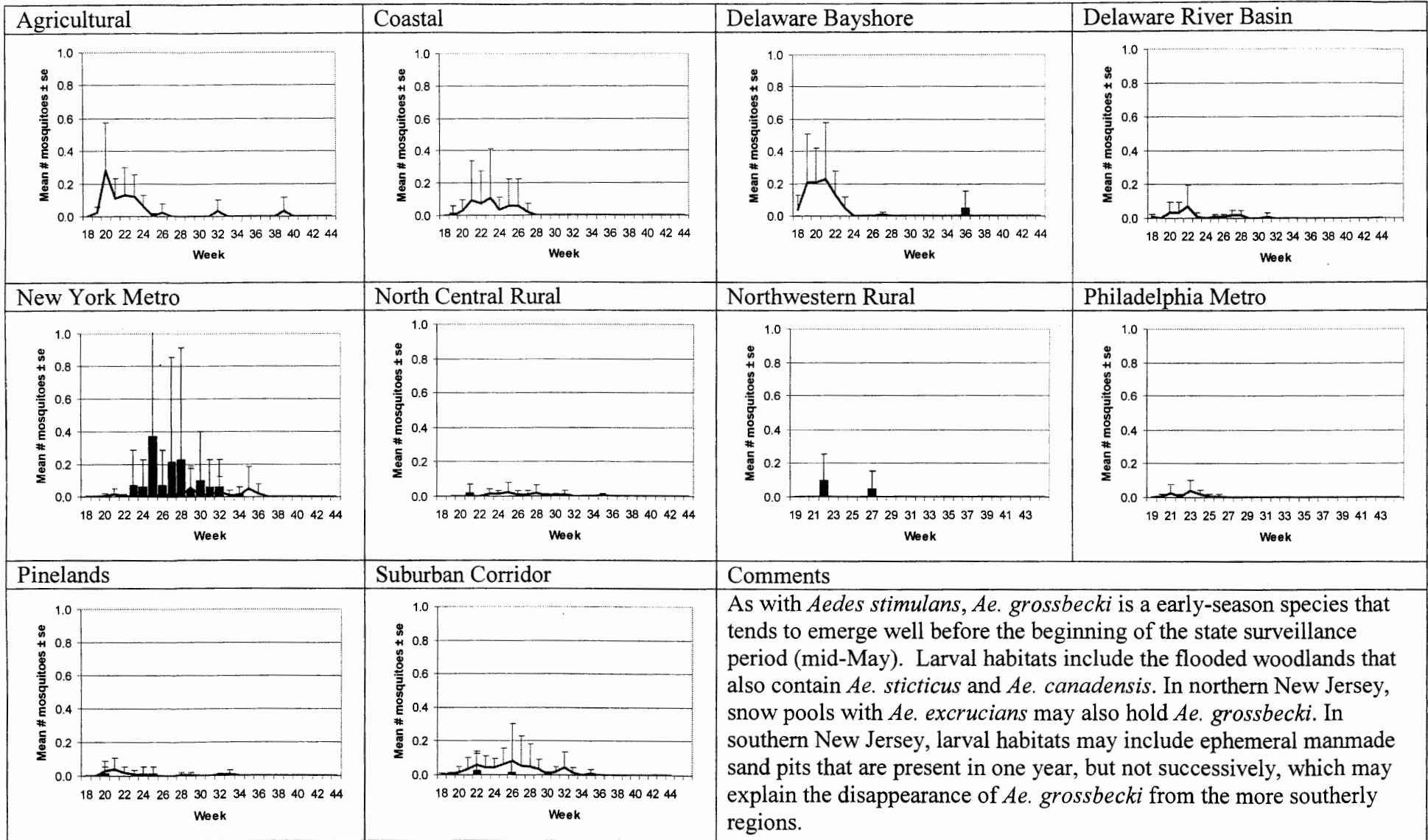
## *Aedes cantator* – Multivoltine Aedine (sollicitans type)



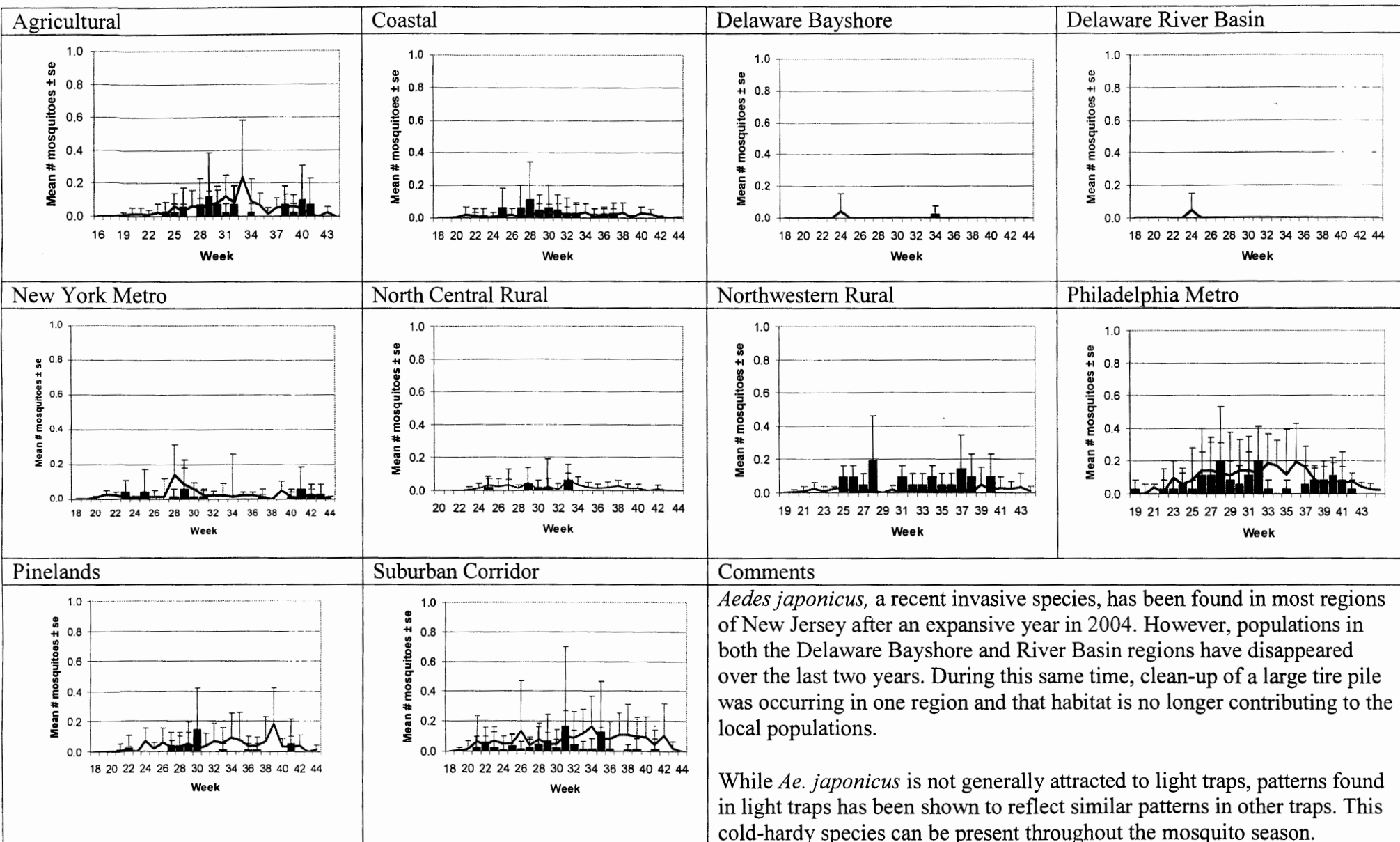
## *Aedes cinereus* - Univoltine Aedine, *canadensis* Type



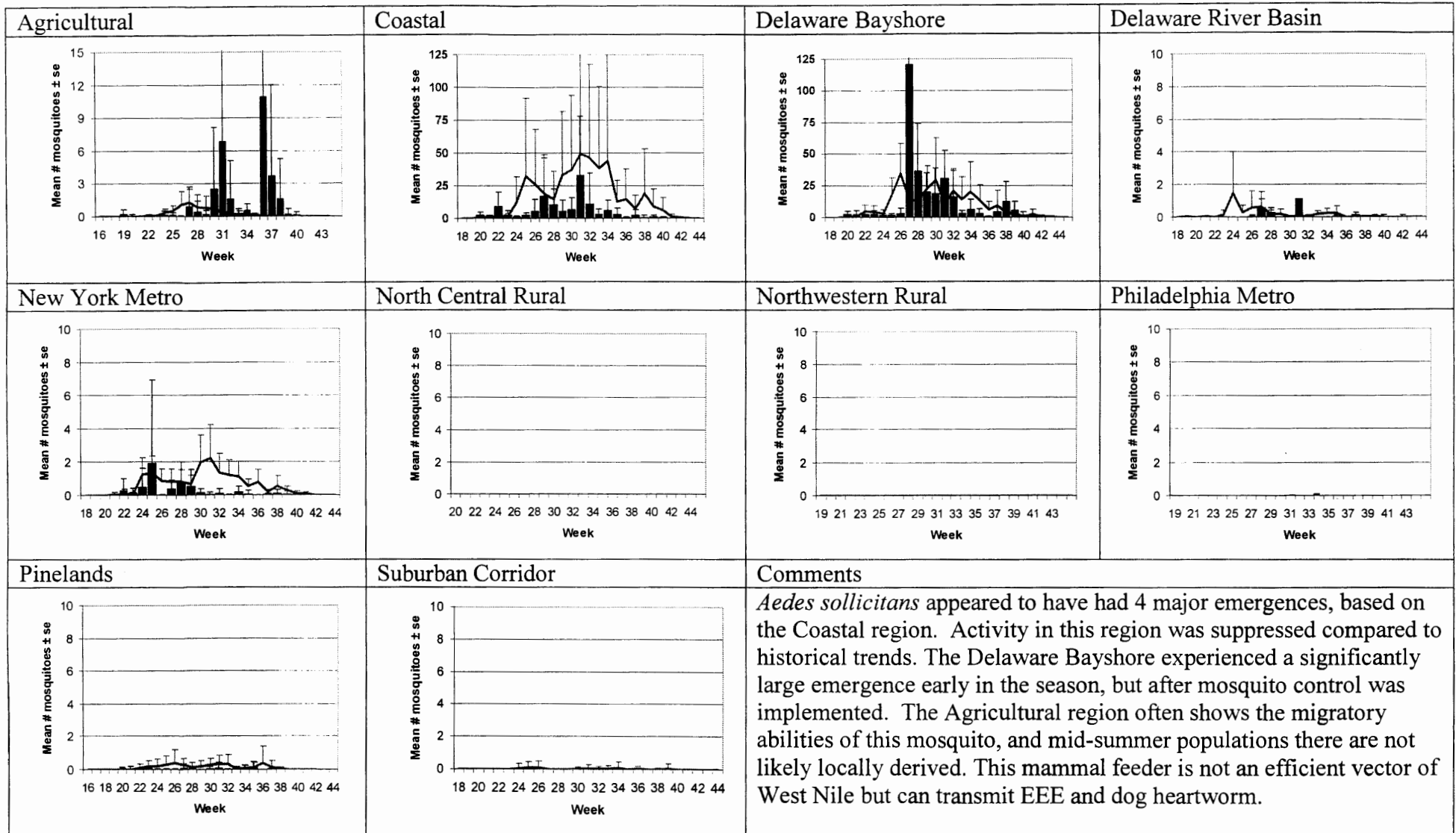
## *Aedes grossbecki* – Univoltine Aedine (stimulans type)



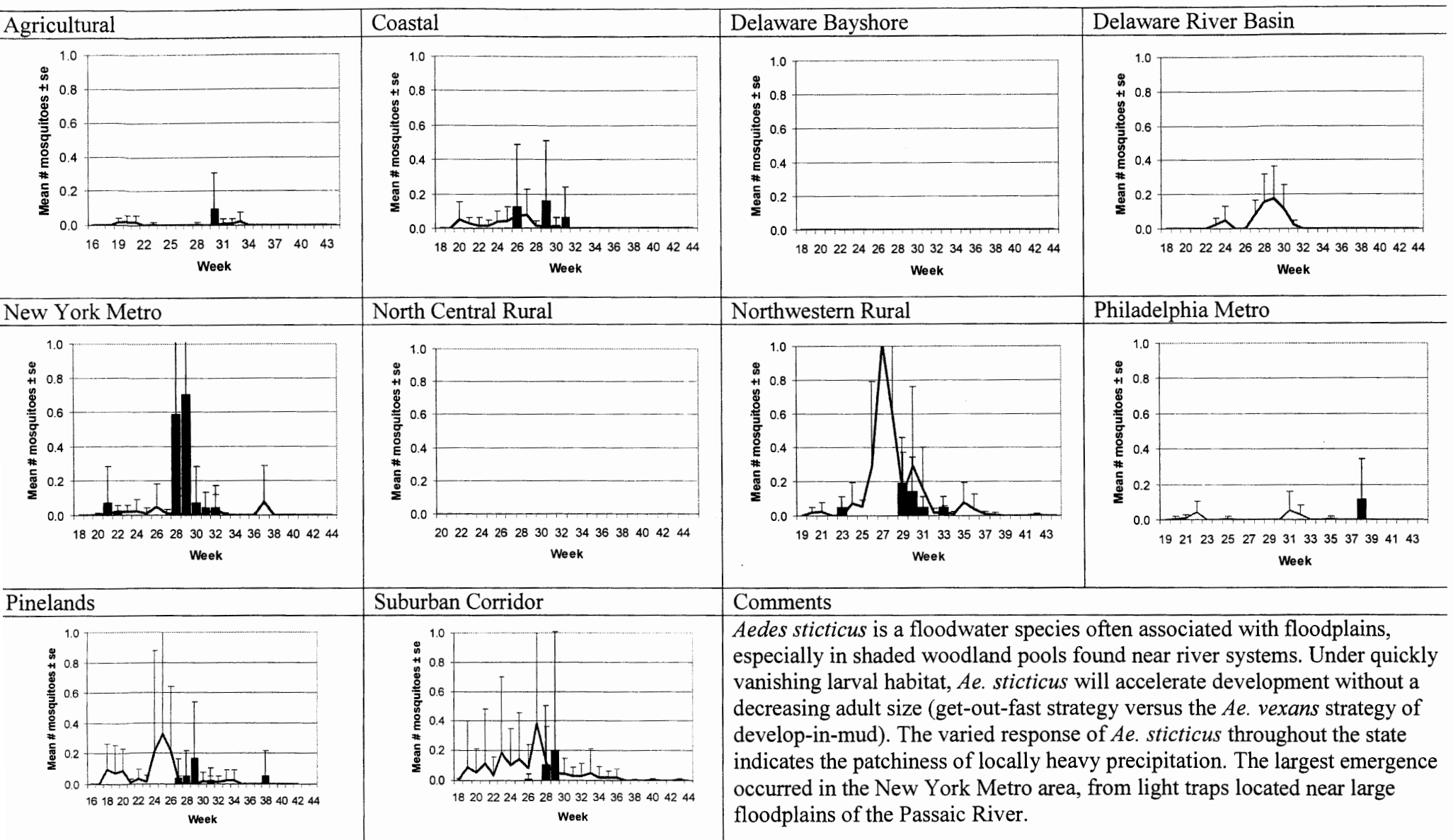
## *Aedes japonicus* – Multivoltine Aedine, *triseriatus* Type



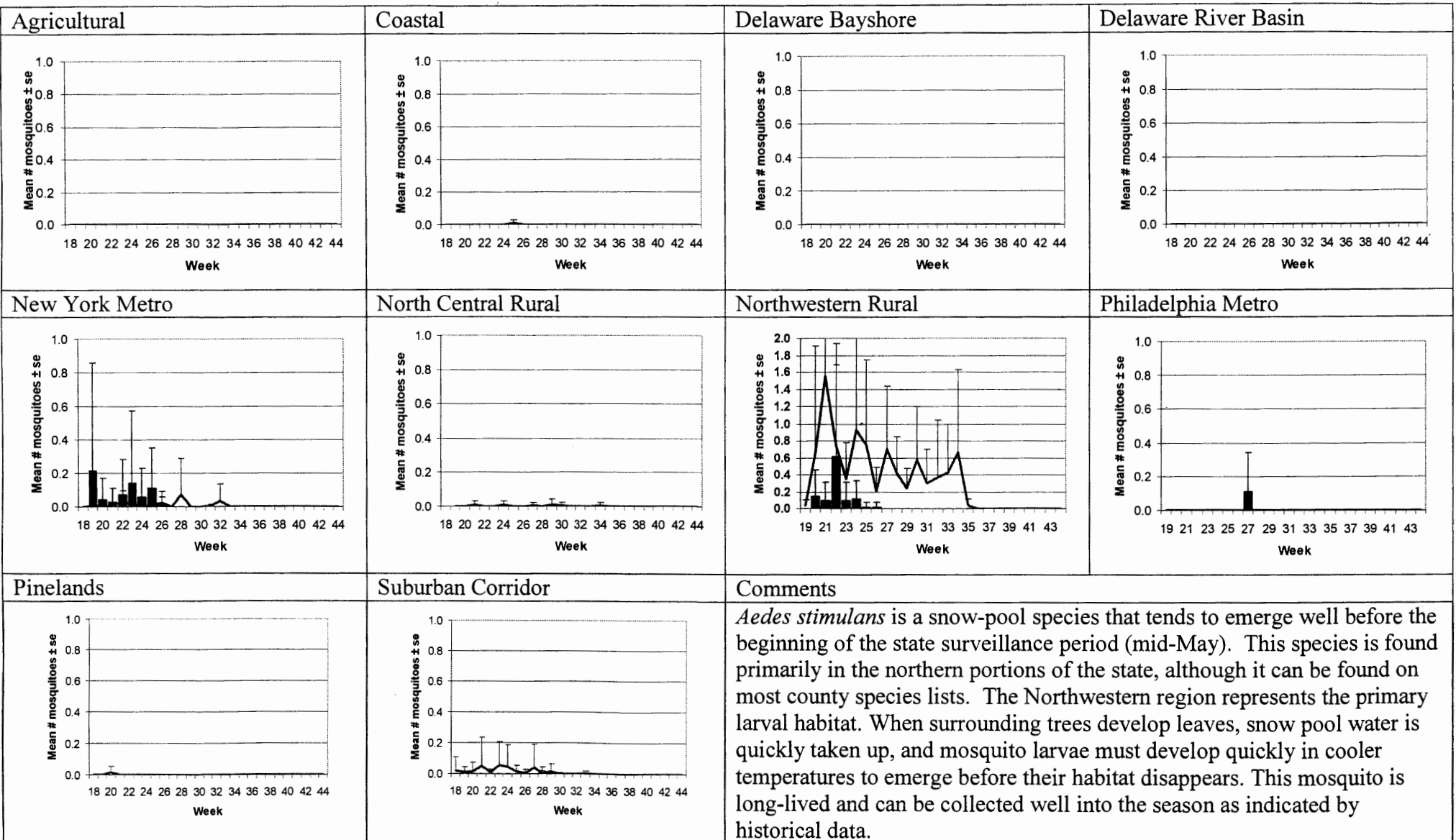
## *Aedes sollicitans* - Salt Marsh Floodwater Species



## *Aedes sticticus* - Univoltine Aedine, *canadensis* Type



## *Aedes stimulans* – Univoltine Aedine (stimulans type)



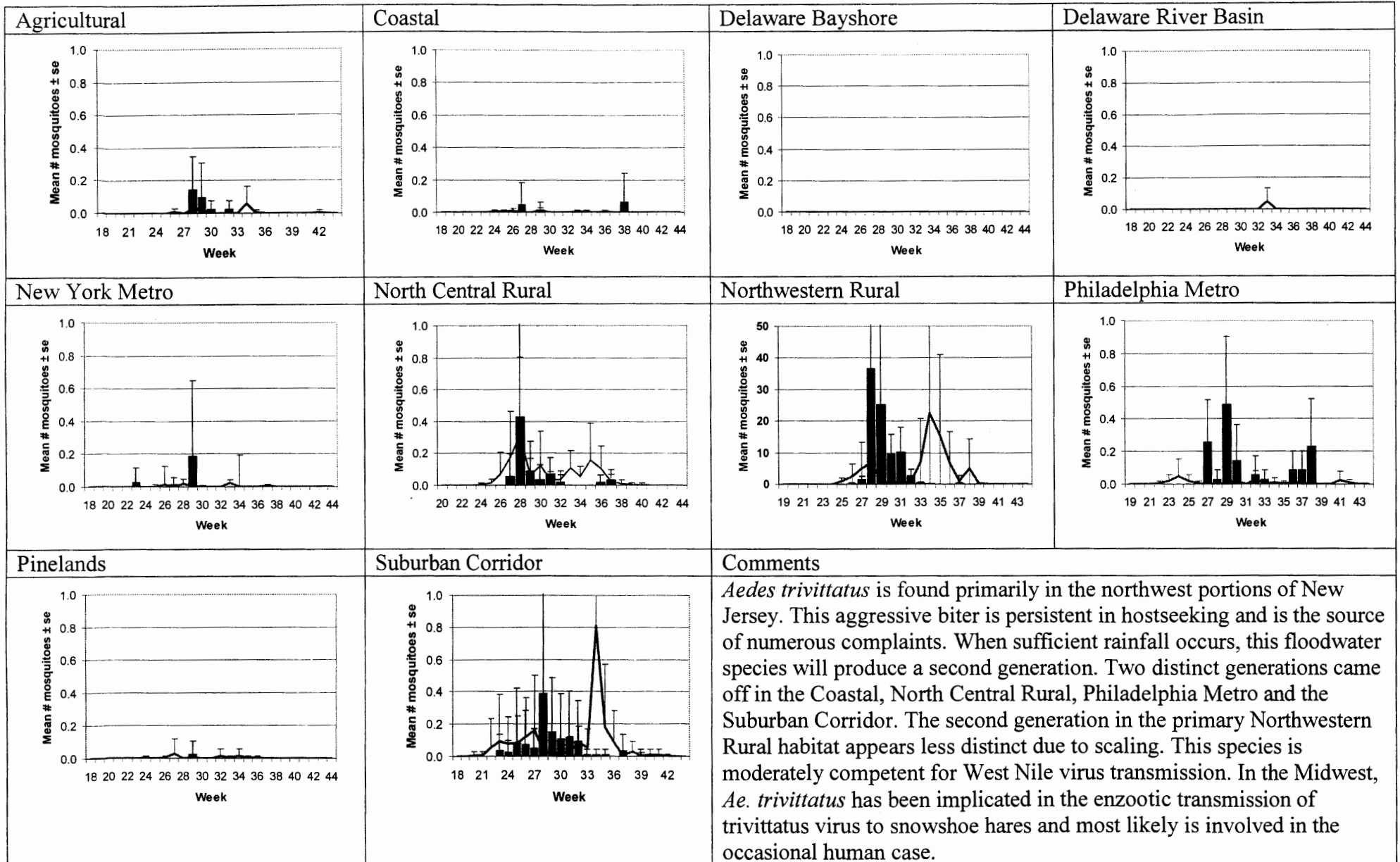
# *Aedes taeniorhynchus* – Multivoltine Aedine, *sollicitans* Type

<p><b>Agricultural</b></p>	<p><b>Coastal</b></p>	<p><b>Delaware Bayshore</b></p>	<p><b>Delaware River Basin</b></p>
<p><b>New York Metro</b></p>	<p><b>North Central Rural</b></p>	<p><b>Northwestern Rural</b></p>	<p><b>Philadelphia Metro</b></p>
<p><b>Pinelands</b></p>	<p><b>Suburban Corridor</b></p>	<p><b>Comments</b></p> <p><i>Aedes taeniorhynchus</i> is a salt floodwater species that has a wide range of salt tolerance yet primary habitat is largely limited to the Delaware Bayshore and Coastal regions. Rainfall and tides can precipitate large emergences, particularly in states south of New Jersey. In this state, <i>Ae. taeniorhynchus</i> is a minor pest in comparison to <i>Ae. sollicitans</i>. Population levels in the Delaware Bayshore were higher than recent historical trends and occurred after early mosquito control was conducted. This species has shown up in the Agricultural region at the site closest to the Bayshore region. Temporary crowding as larvae can induce migratory behavior in <i>Ae. taeniorhynchus</i> (Nayar &amp; Sauerman 1975) and may contribute individuals to inland sites.</p>	

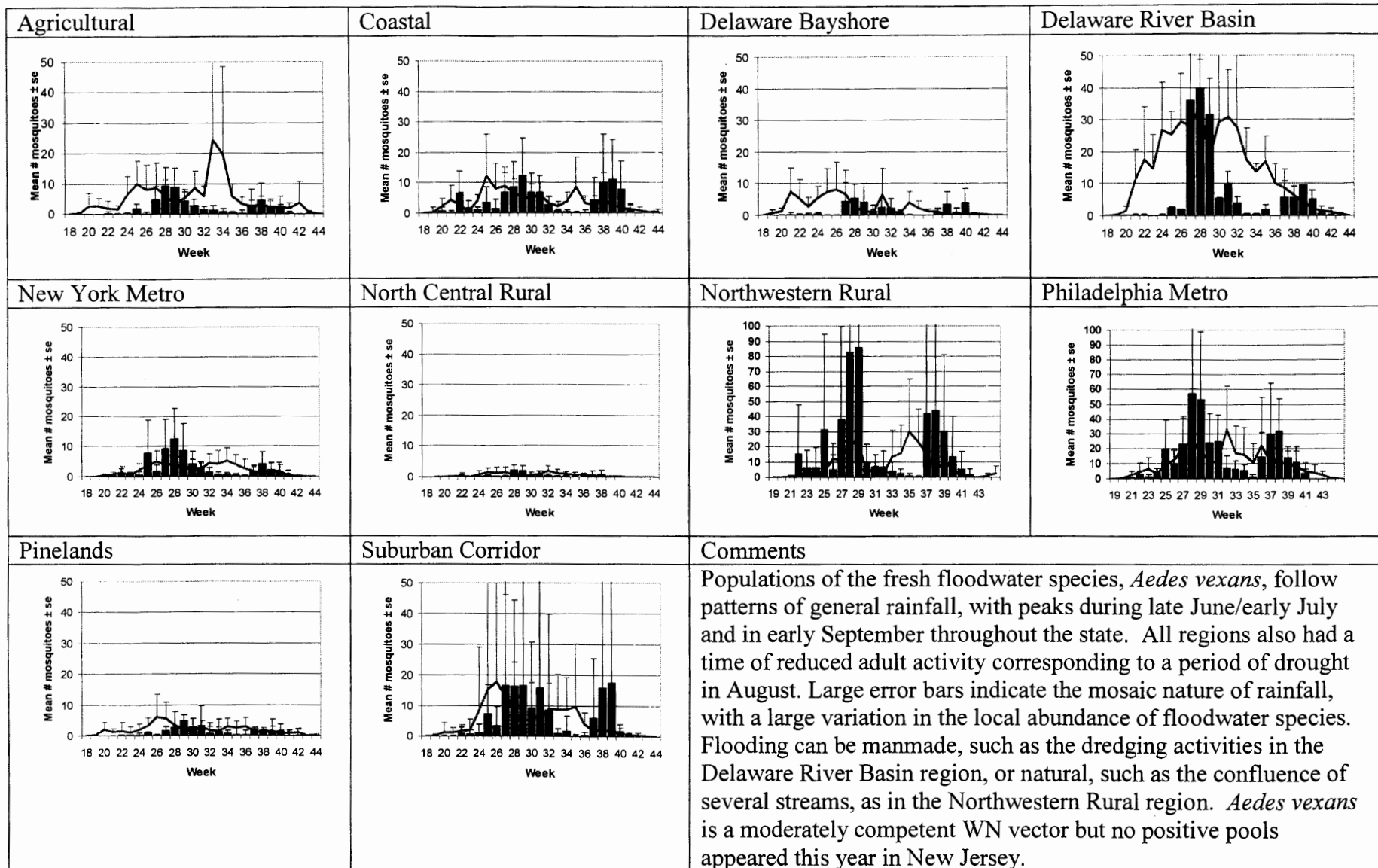
## *Aedes triseriatus* - Multivoltine Aedine, *triseriatus* Type

<p><b>Agricultural</b></p>	<p><b>Coastal</b></p>	<p><b>Delaware Bayshore</b></p>	<p><b>Delaware River Basin</b></p>
<p><b>New York Metro</b></p>	<p><b>North Central Rural</b></p>	<p><b>Northwestern Rural</b></p>	<p><b>Philadelphia Metro</b></p>
<p><b>Pinelands</b></p>	<p><b>Suburban Corridor</b></p>	<p><b>Comments</b></p> <p>As with <i>Ae. trivittatus</i>, <i>Aedes triseriatus</i> is most abundant in the northwestern portions of New Jersey. It is similarly less attracted to light traps. <i>Ae. triseriatus</i> is also a floodwater species that uses treeholes, tires and other contained spaces as larval habitat. Repeated floodings of the container can cover eggs laid above the original water line and contribute to emergences throughout the season. Abundances of this species appeared suppressed in the Delaware River Basin and the Philadelphia Metro regions in comparison to recent historical trends. This species is a vector of La Crosse virus, transmitting the virus to chipmunks. It is also an efficient vector of West Nile and may contribute to human transmission in areas of the US where populations are high.</p>	

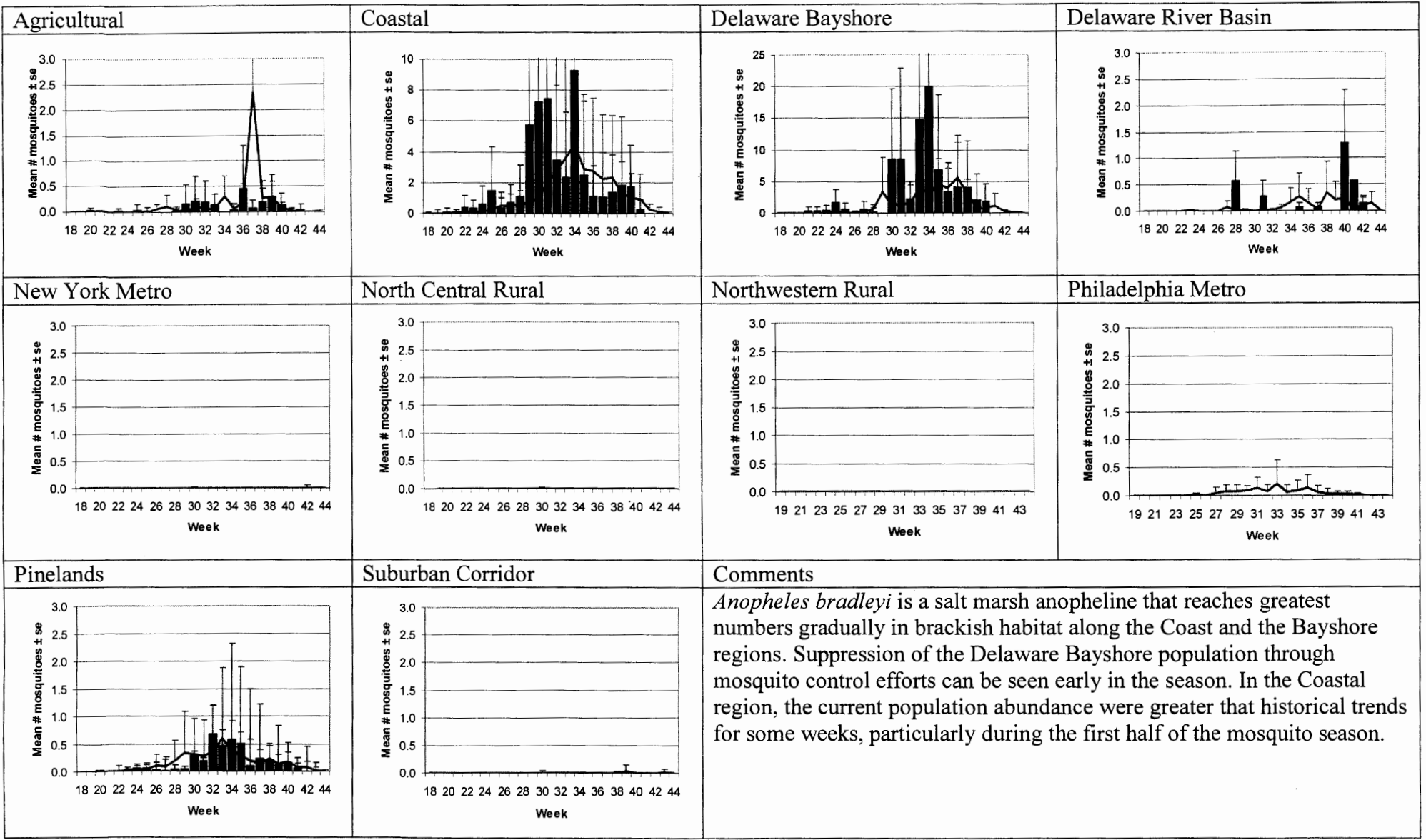
# *Aedes trivittatus* – Multivoltine Aedine, *vexans* Type



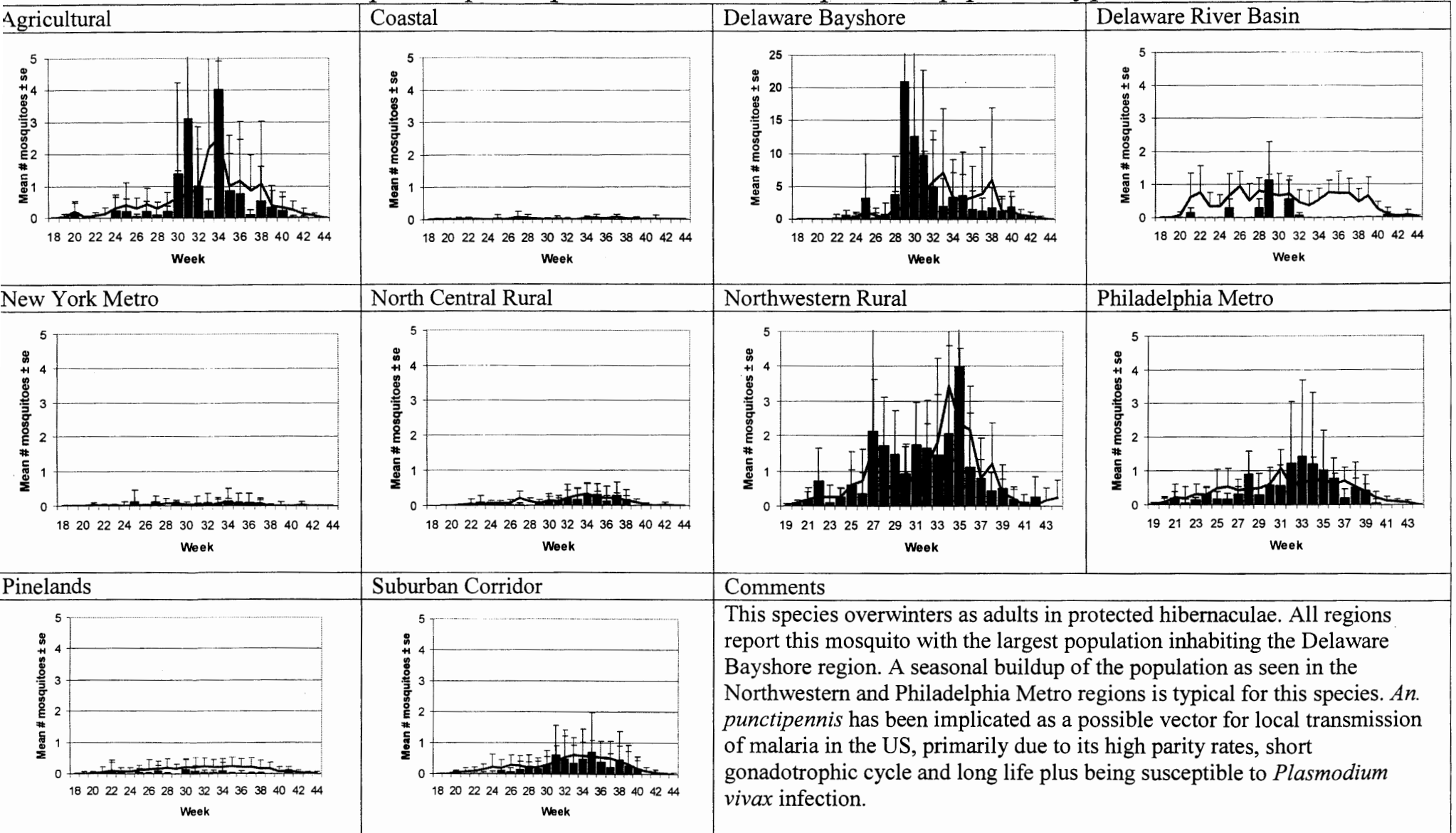
## *Aedes vexans* - Fresh Floodwater Species



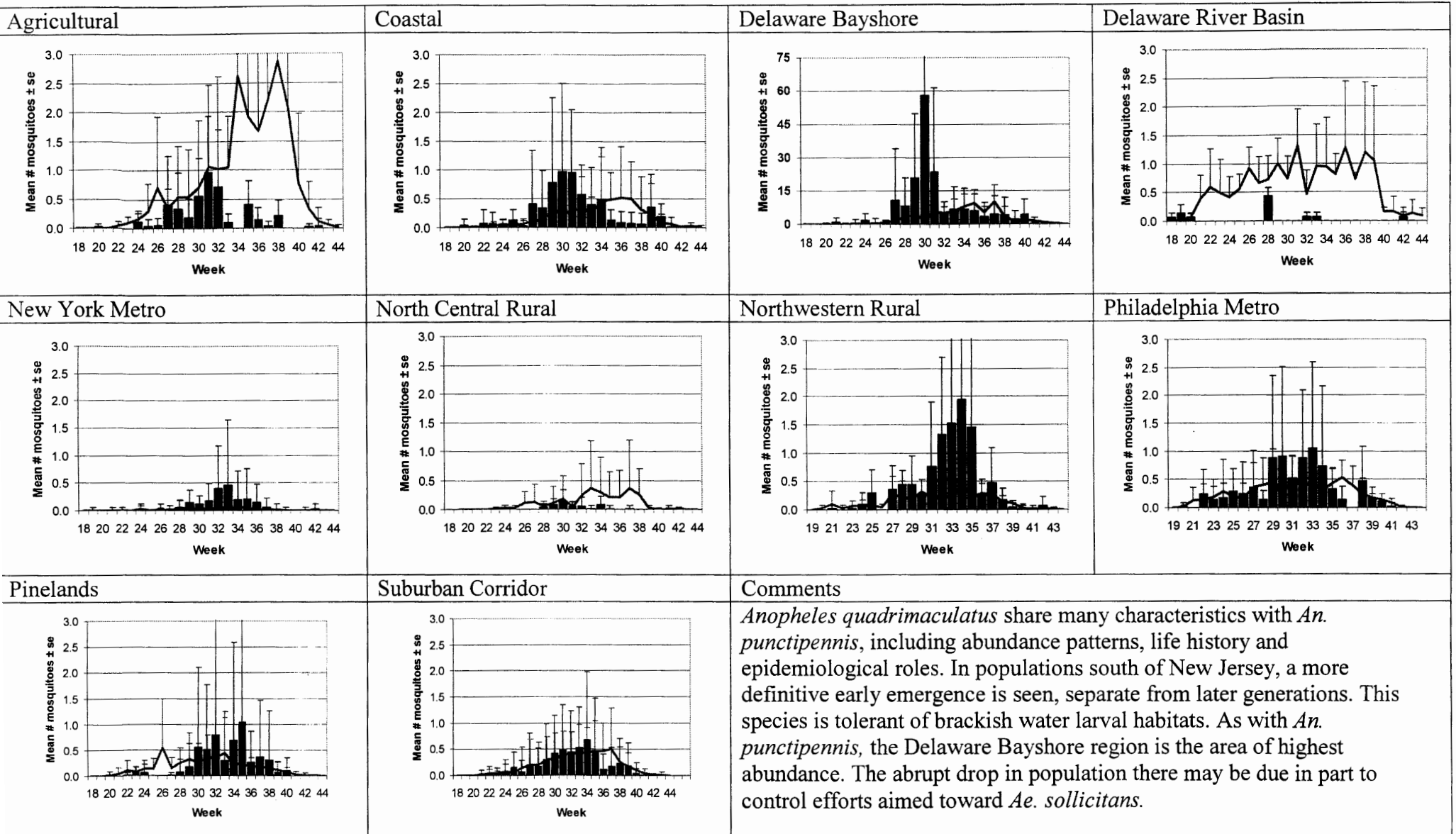
# *Anopheles bradleyi* – Culex/Anopheline, *salinarius* Type



## *Anopheles punctipennis* – *Culex/Anopheline, pipiens* Type



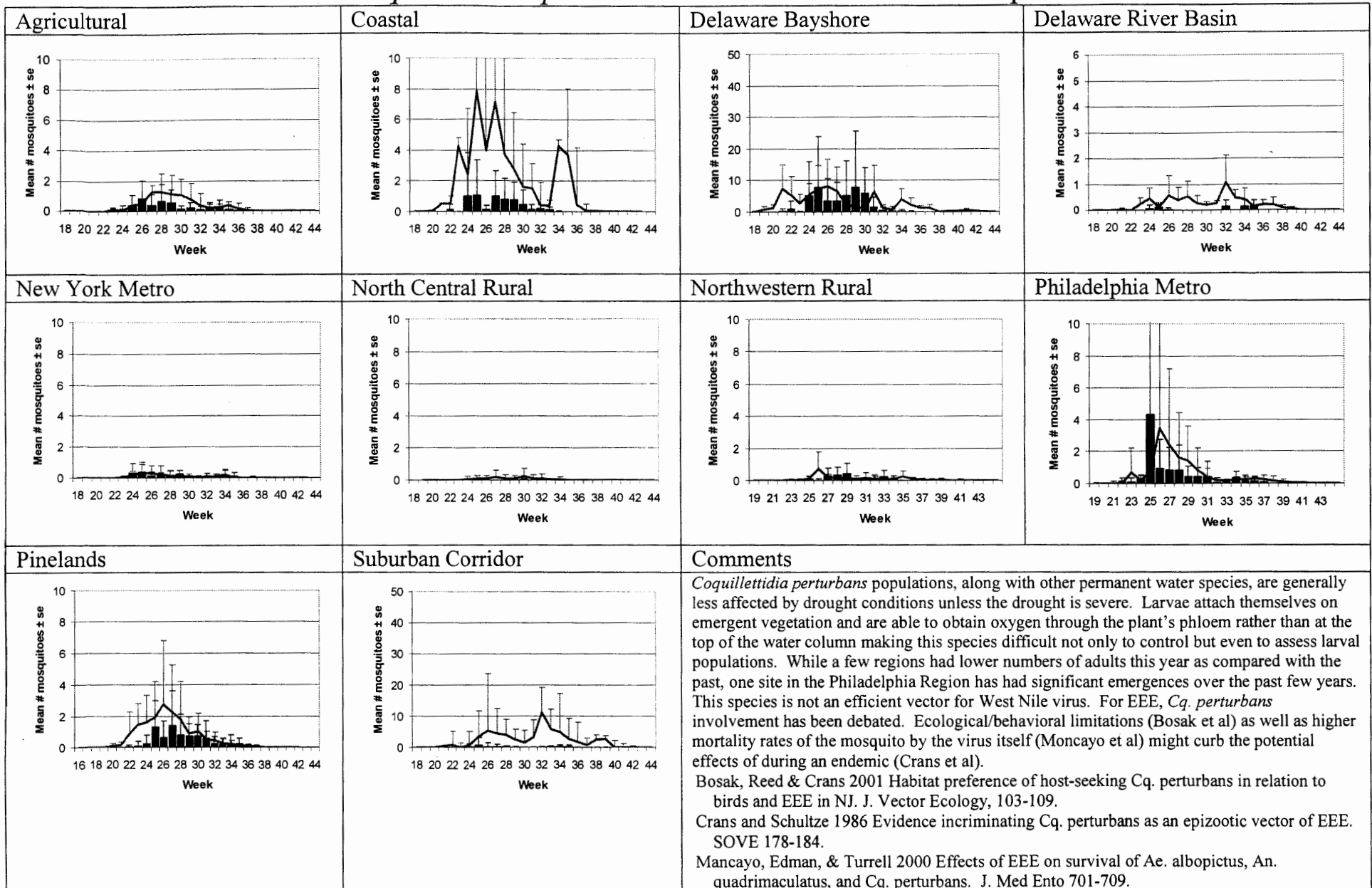
# *Anopheles quadrimaculatus* – Culex/Anopheline, *quadrimaculatus* Type



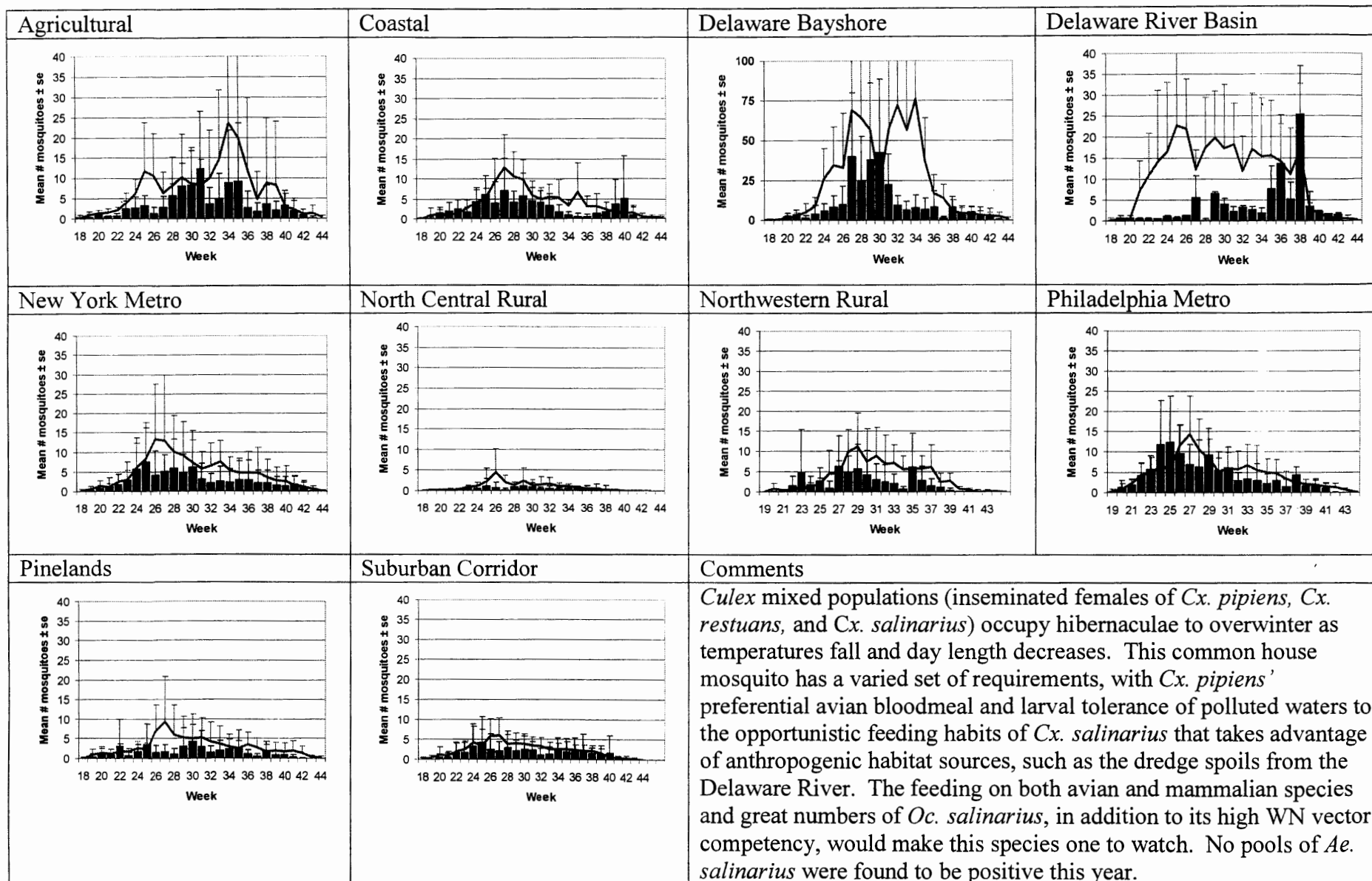
## *Anopheles walkeri* – Monotypic, *walkeri* Type

<p><b>Agricultural</b></p>	<p><b>Coastal</b></p>	<p><b>Delaware Bayshore</b></p>	<p><b>Delaware River Basin</b></p>
<p><b>New York Metro</b></p>	<p><b>North Central Rural</b></p>	<p><b>Northwestern Rural</b></p>	<p><b>Philadelphia Metro</b></p>
<p><b>Pinelands</b></p>	<p><b>Suburban Corridor</b></p>		
<p><b>Comments</b></p> <p><i>Anopheles walkeri</i> overwinters as eggs – the only anophelines to do so in the northeastern US. This is one of the earlier non-aedine mosquito to emerge in freshwater swamps. <i>An. walkeri</i> has a multivoltine life history and has a minimal distribution throughout the state. Primary habitat is found in certain Suburban areas in Morris County as well as more rural areas in Sussex County. Prolonged drought conditions will reduce permanent water habitat and thus reduce the populations that emerge from it. This likely contributed to the reduced populations seen in the Suburban Corridor.</p>			

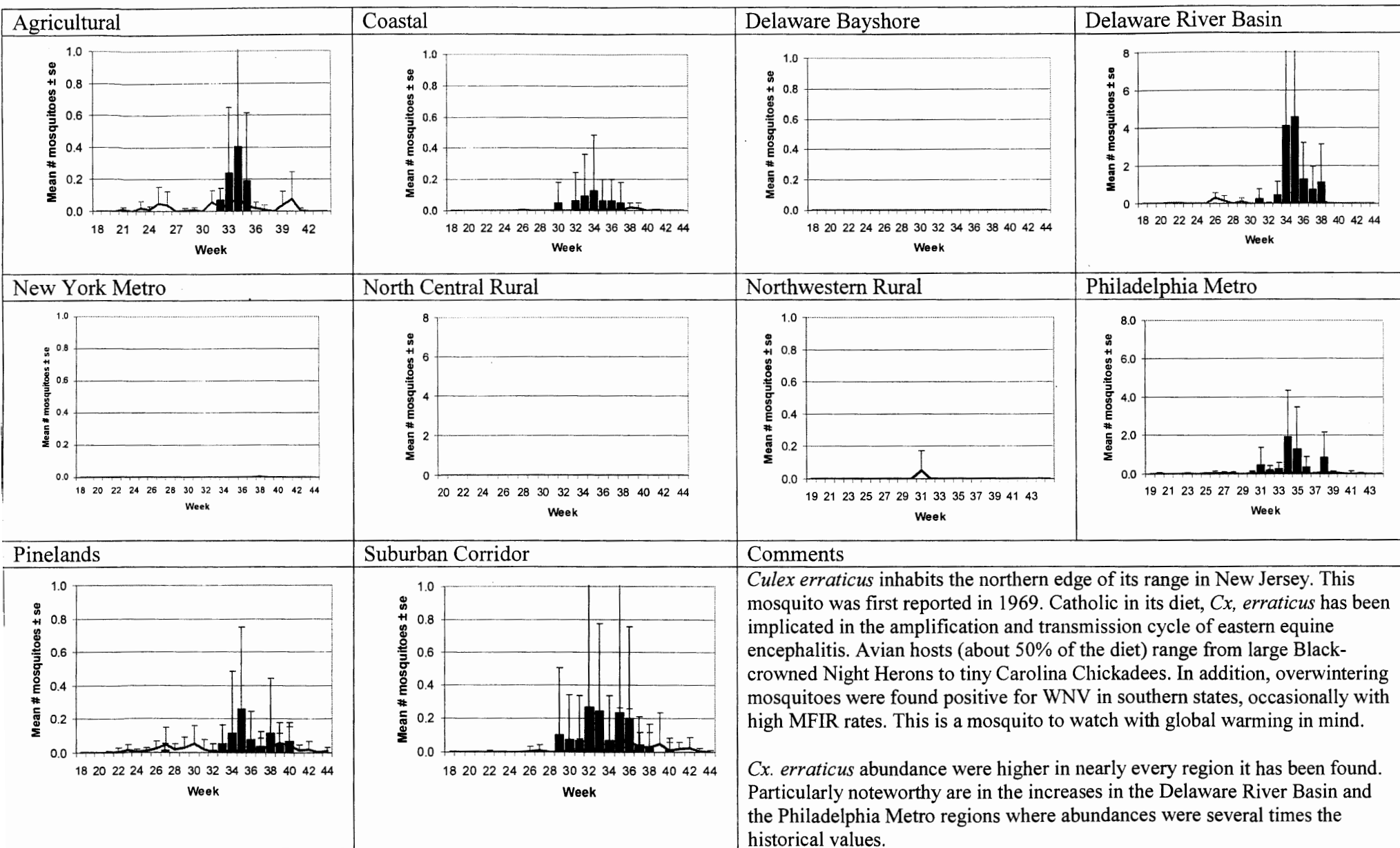
## Coquillettidia perturbans – Miscellaneous Group



## Culex Mix - Multivoltine Culex Species



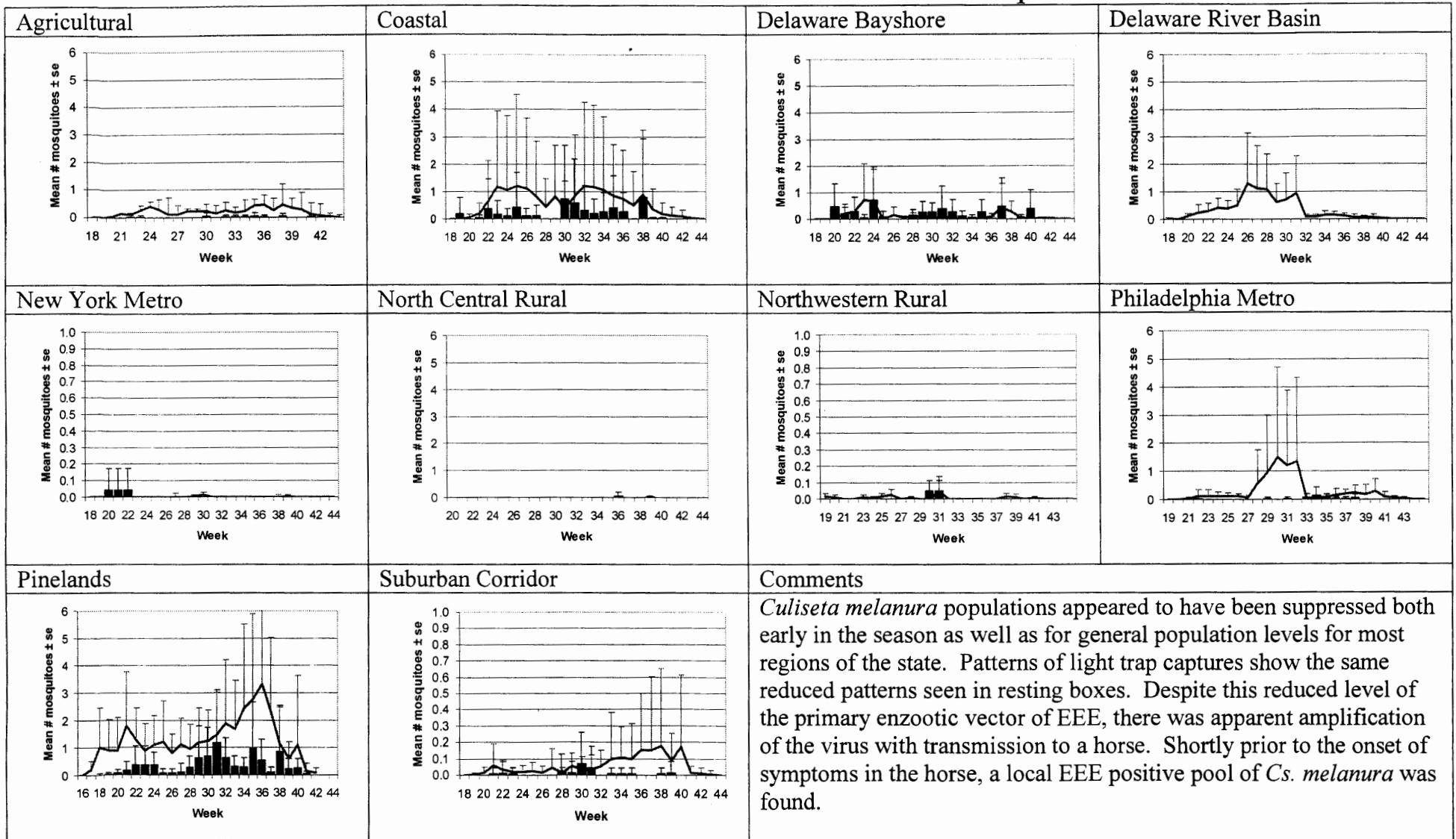
## *Culex erraticus* – *Culex/Anopheles quadrimaculatus* Type



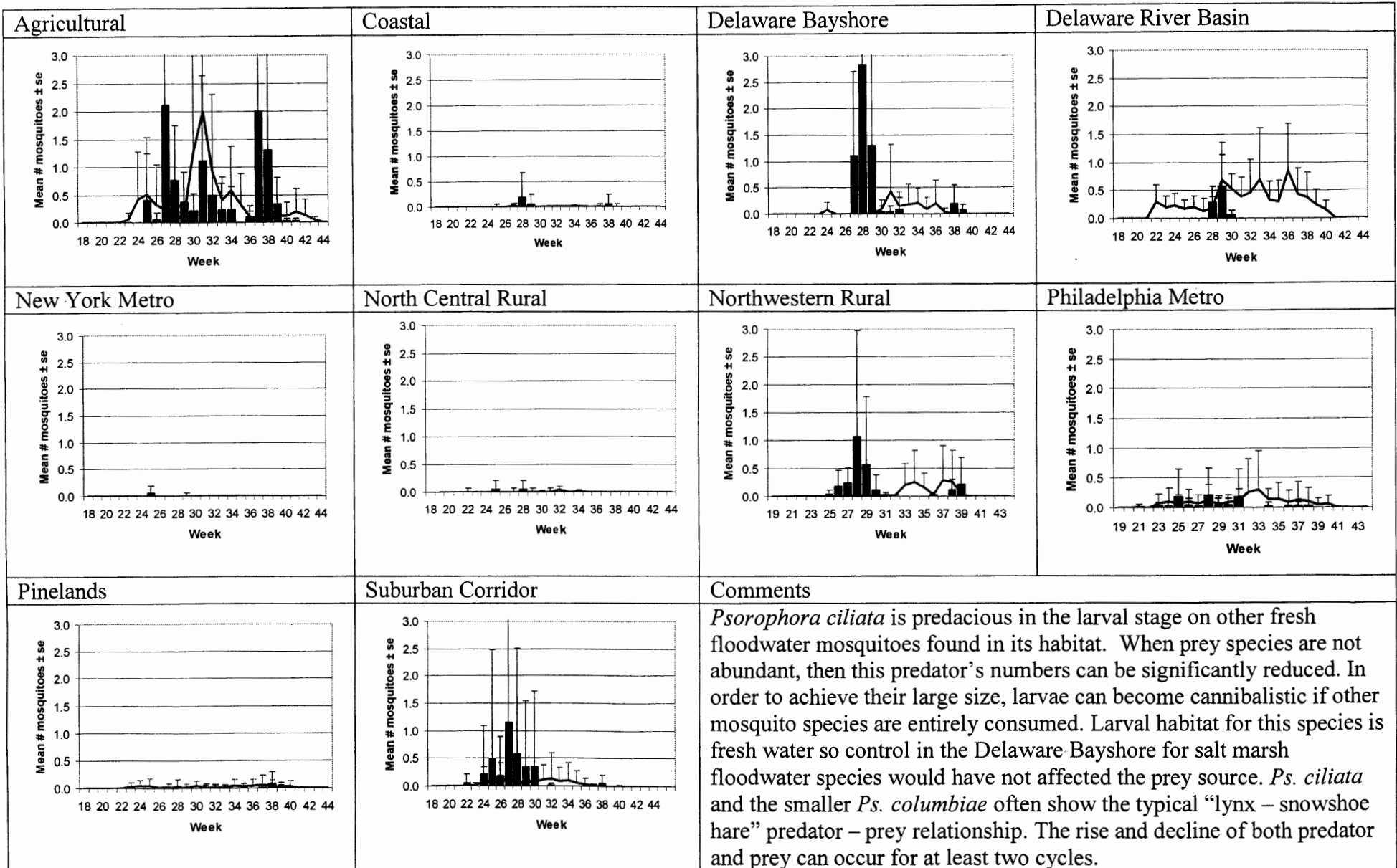
## *Culex territans* – *Culex/Anopheline, quadrimaculatus* Type

Agricultural	Coastal	Delaware Bayshore	Delaware River Basin
New York Metro	North Central Rural	Northwestern Rural	Philadelphia Metro
Pinelands	Suburban Corridor	Comments	
		<p><i>Culex territans</i> is a specialized frog-feeder and has evolved cold-tolerance that should allow it to be active when early-season frogs come out of hibernation to breed. First generation likely emerged prior to the beginning of the trap season. This mosquito does not normally migrate far from its natal territory. Highest abundances of <i>Cx. territans</i> is historically found in the Pinelands despite a limited number of anuran species that inhabit this region. <i>Cx. territans</i> populations can fluctuate with precipitation and freshwater floodings. In 2004, Delaware River Basin experienced high <i>Cx. territans</i> populations, likely the result of rainfall from the passing Hurricane Ivan. This year there were no <i>Cx. territans</i> caught in light traps used in this program.</p>	

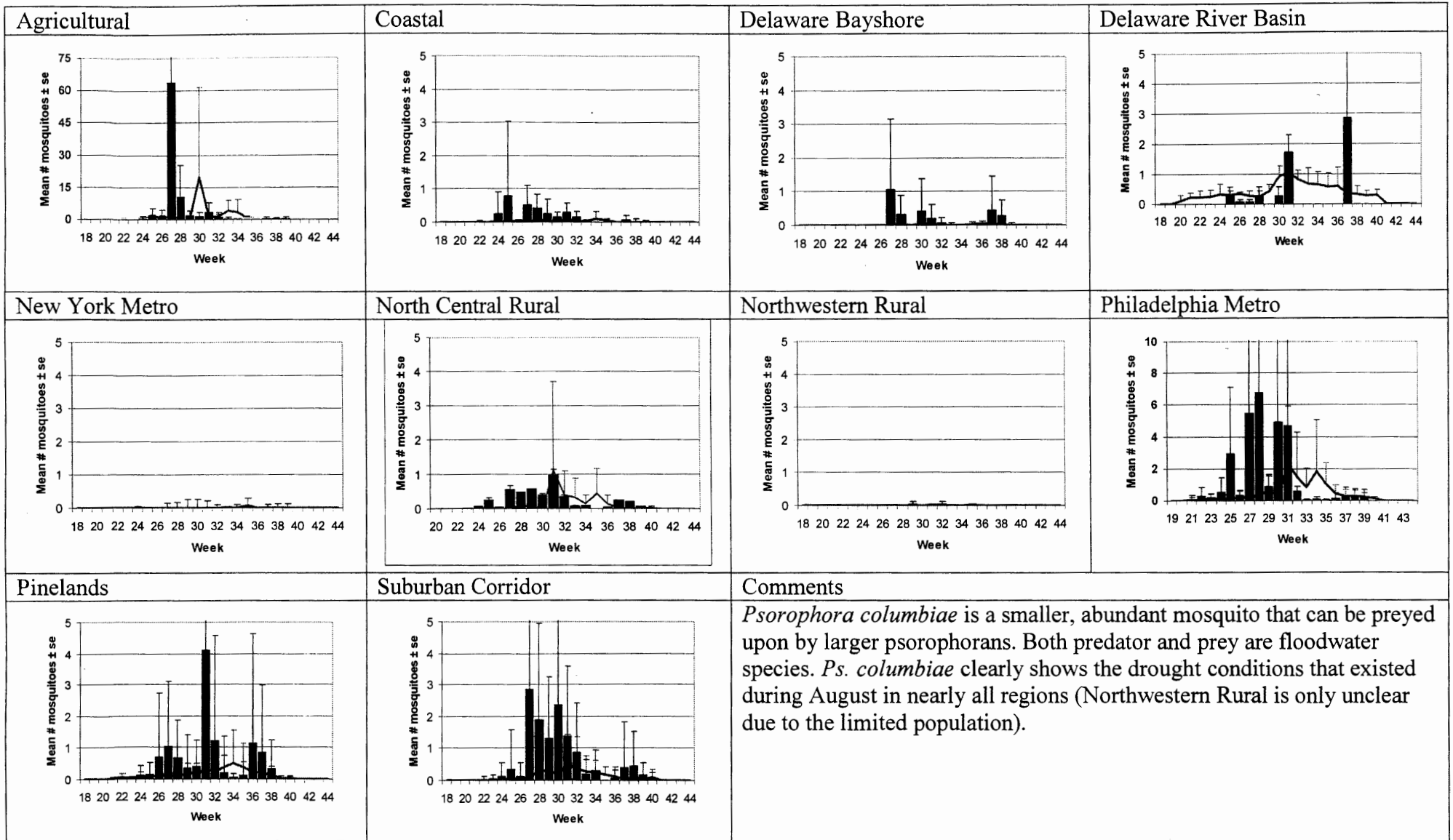
## *Culiseta melanura* – Miscellaneous Group



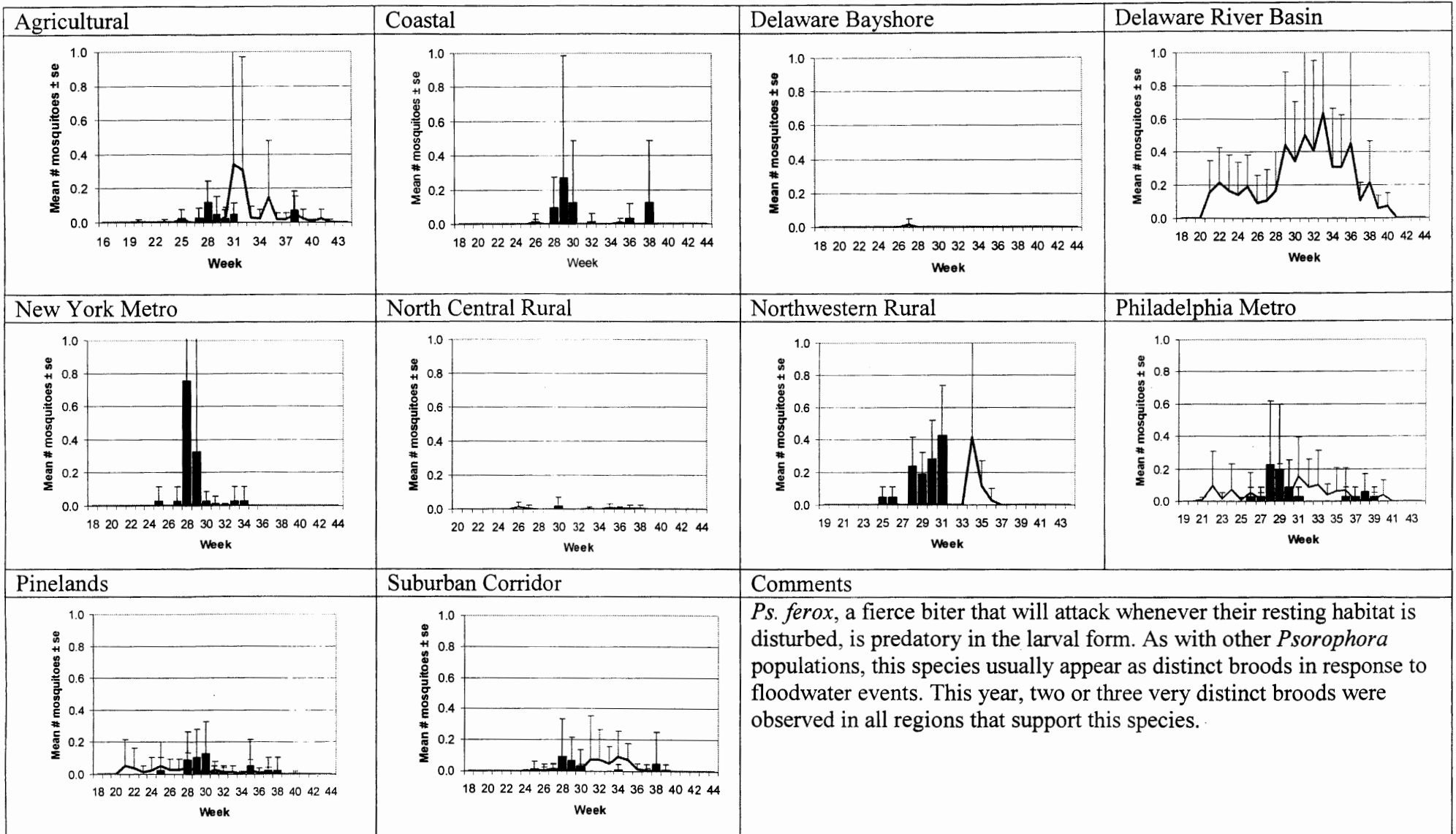
## *Psorophora ciliata* - Multivoltine Aedine, *vexans* Type



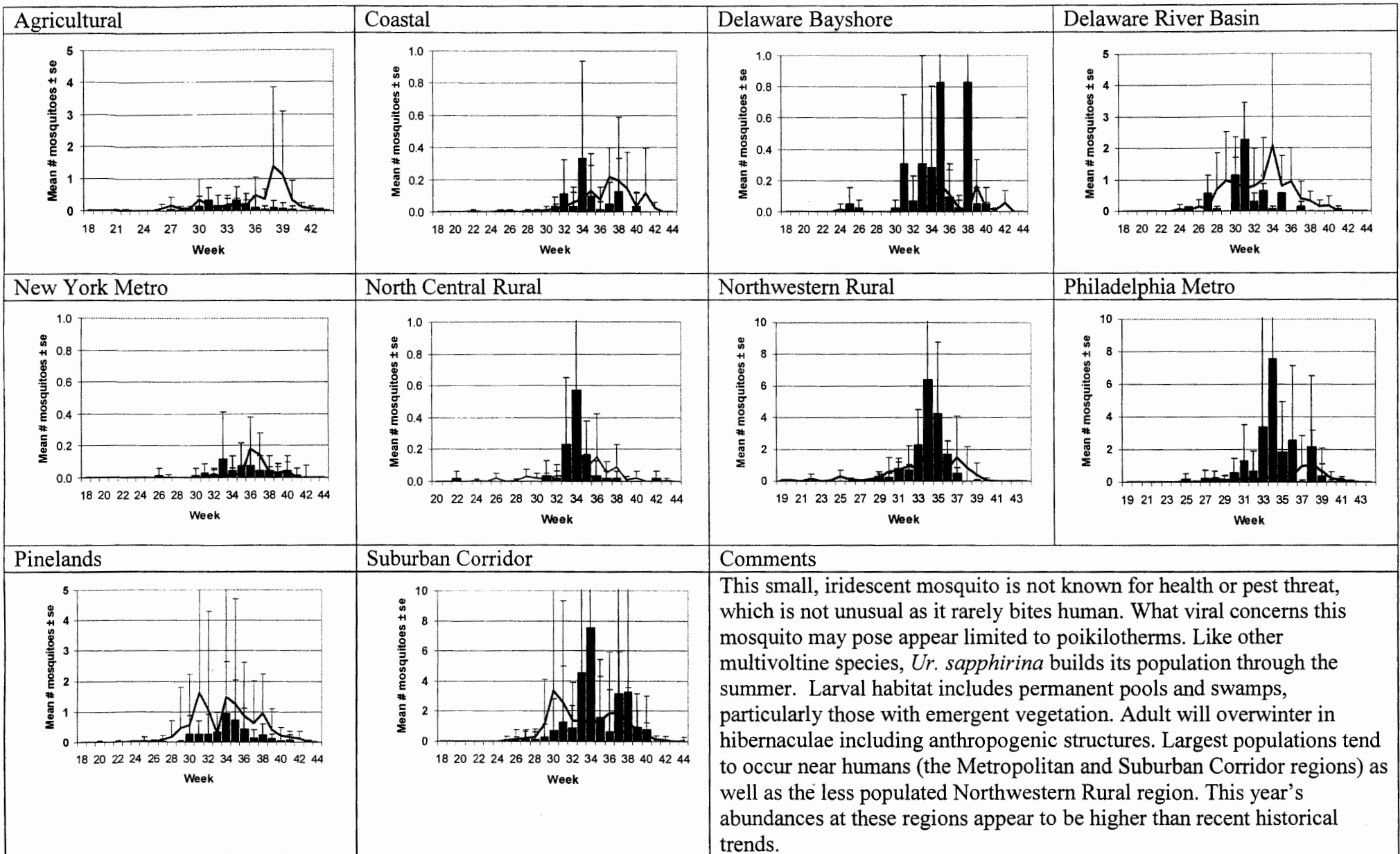
*Psorophora columbiae* - Multivoltine Aedine, *vexans* Type



## *Psorophora ferox* - Multivoltine Aedine, *vexans* Type



# *Uranotaenia sapphirina* – Culex/Anopheline, *quadrimaculatus* Type



**Williams' Mean Comparison and the Applicability to the Statewide Adult Mosquito Surveillance Program.** In 1969, Bidlingmayer suggested that using modified geometric means in reporting mosquito population data was more appropriate than using arithmetic means. His argument included the high potential of skewed data where one or more traps may be trapping significantly higher numbers of mosquitoes, and the influence of a minority of traps can thus outweigh the behavior of the majority. As an example, Bidlingmayer showed that nine out of ten traps to have increased from one trap day to the next, but if the tenth trap catches a magnitude of mosquitoes more than the other nine traps and decreases substantially, then the overall effect of the arithmetic mean is a decrease. A general decrease is not the behavior of most of the traps in this example, but just the opposite. The geometric mean in this particular case would have indicated an increase. Geometric means are less affected by these large differences in catches that traps show over the season and are less influenced by traps that are catching different populations of mosquitoes, as is expected in the statewide program. This section considers the effects of calculating Williams' means on statewide data.

Two sets of data were used in this comparison: *Aedes vexans* from the Northwestern Rural was used for datasets that catch a wide range of mosquitoes (potential to several hundred per night), and *Aedes japonicus* whose trap numbers are usually very low (about 1 or 2 a few times a week). Williams' means were calculated and graphs generated in the same manner as for arithmetic means after transformation. First, a 1 was added to each mosquitoes caught per trap night to compensate for a lack of a logarithm for any zero value. All trap night values were transformed with  $\log_{10}$ . Averages were calculated as usual and the value 1 was subtracted from the weekly mean to produce the Williams' mean. These means were plotted to compare with the same data as illustrated by the arithmetic mean.

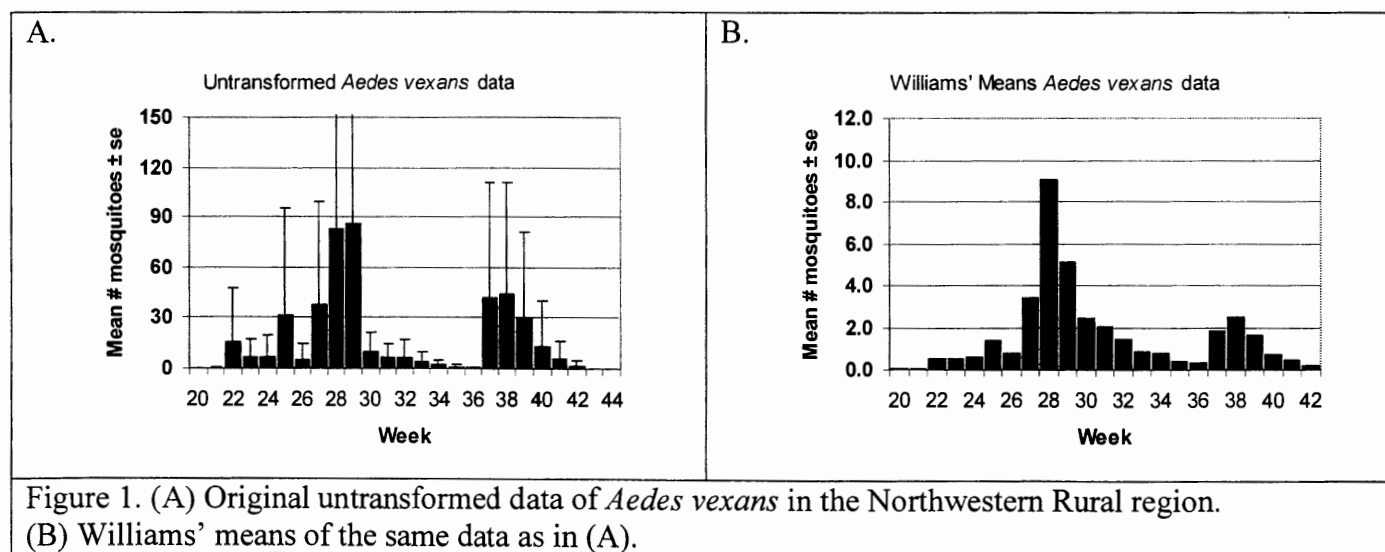


Figure 1 illustrates the two means. Graph A was reported by this program for this year, and Graph B is the Williams' means transformation of that data. The general pattern between the two graphs is similar, with two obvious deviations. First, Week 22 is calculated to be larger than the two following weeks for the arithmetic mean than for the Williams' mean. Second, Week 29 is

calculated to be larger than Week 28 in the arithmetic mean than for the Williams' mean. The scores for Week 22 were 21, 0, 614, 1, 4 and 1. The scores for Week 29 were 51, 128, 2502, 46, 815 and 59. During Week 28, the third trap caught more than 2200 mosquitoes on one night while the same trap caught more than 1000 mosquitoes on two successive nights the following week. This, the arithmetic mean increased while the logarithmic-based Williams' mean decreased. The Williams' means were performing as expected by minimizing the impact of the larger trap catches that would skew the calculation of an arithmetic mean.

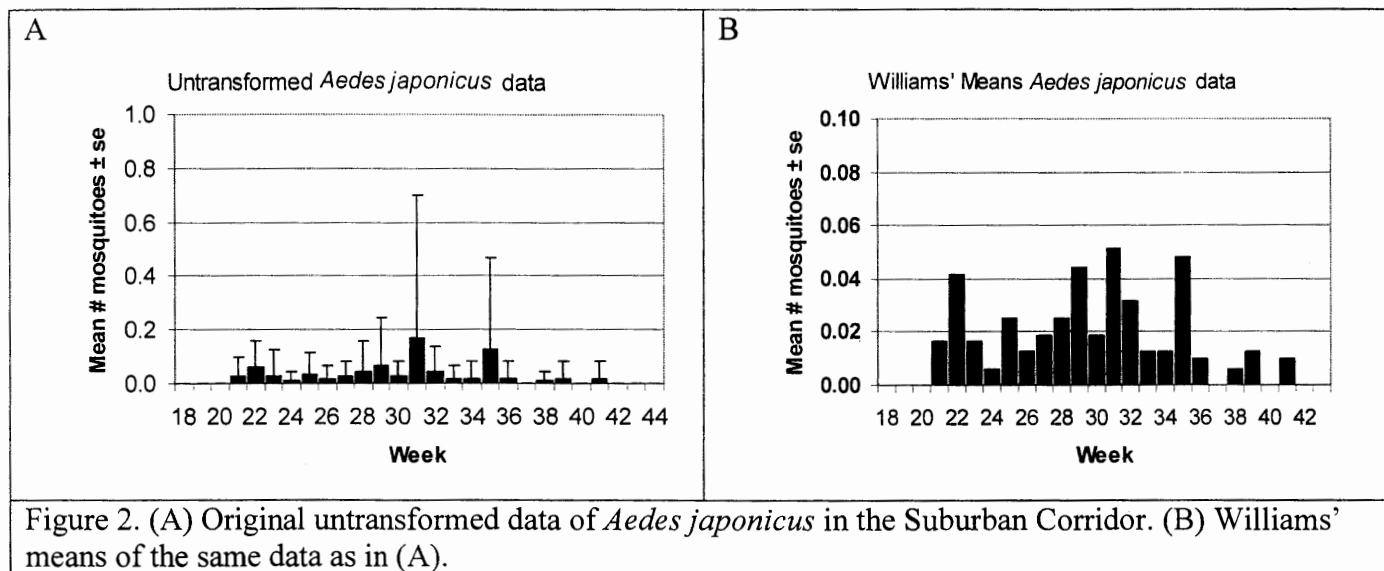


Figure 2 illustrates the application of the Williams' means to a population of mosquitoes that are both low in abundance and has numerous zero points in the dataset. The absolute pattern between the two datasets remains the same. However, the contribution at either end of the season was emphasized relative to the rest of the data. This is the effect of adding 1 (or any positive value) to zero values. For weeks that collect no mosquitoes, there is no difference between the arithmetic and Williams' means as taking the antilog of the transformed value and subtracting 1 will bring the Williams' mean back to zero. But if there are positive values in the dataset, then the addition of 1 to any zero for that week will inflate the Williams' mean. Because the values are small to begin with, the effects of the inflation are more pronounced than for datasets such as the *Aedes vexans* in the Northwestern Rural region (Smith 1995).

Bidlingmayer (1969) did not mention the illustration of variance around the weekly means as is done for the untransformed data. In the weekly reports, standard deviations of the populations are used to show variance and it is frequently noted in the comments sections that larger bars indicate more variation. Sources of that variation is often identified, noting that if one or two traps are catching significantly more mosquitoes than the rest of the traps in the region, then this is the source of the high degree of variation seen. Without a reported indication of variation, the interpretation of a significant difference between the weekly means and historical trends cannot be made. In addition to this, any conclusions about the dataset are restricted to the type of data entering the analysis,

whether the analysis is a computer-aided comparison or a conclusion drawn from graphs. Conclusions drawn from transformed data are about the transformed means, not the original means (Keppel 1973).

Williams' means are appropriate calculations for abundant mosquito species that are attracted to the light trap when the trapping of these species create datasets that are variable in the contributing elements and that most elements are greater than zero. But for datasets in which the mosquito species is not attracted to the light trap resulting in low numbers and numerous zeroes, then the Williams' means over-inflates these values. Despite low trap numbers, some light trap patterns for species such as *Ae. japonicus* may nonetheless be representative of the true population patterns (Falco 2002). The application of the Williams' mean would indicate more of this species that are likely to be present.

Recommendation: At this time, the recommendation would be to continue using the arithmetic means for all reported species given that sources of variation are indicated in the comments sections of the species accounts and that an over-inflation of means can occur for species that are caught in low abundance.

#### Literature:

Bidlingmayer, W. L. 1969 The use of logarithms in analyzing trap collections. *Mosquito News*, 29(4): 635-639.

Crans (2004) A classification system for mosquito life cycles: life cycle types for mosquitoes of the northeastern United States. *Journal of Vector Ecology*, June: 1-10.

Falco, R., Daniels, T. J., & M. C. Slamecka. 2002 Prevalence and distribution of *Ochlerotatus japonicus* in two counties in southern New York State. *Journal of Medical Entomology*, 3(6): 920-925.

Keppel, G. 1973 *Design and Analysis: a Researcher's Handbook*. Berkeley CA: Prentice-Hall, pg. 559.

Nayar & Sauerman 1975 Flight and feeding behavior of autogenous and anautogenous strains of the mosquito *Aedes taeniorhynchus*. *Annals ESA*: 68(5): 791-96.

Smith, T. 1995 Proportionality between light trap catches and biting densities of malarial vectors. *Journal of the American Mosquito Control Association*, 11(3): 377-378.

# NEW JERSEY ADULT MOSQUITO SURVEILLANCE

Report for 24 June to 30 June, 2007, Week 26

## Summary table – Week 26

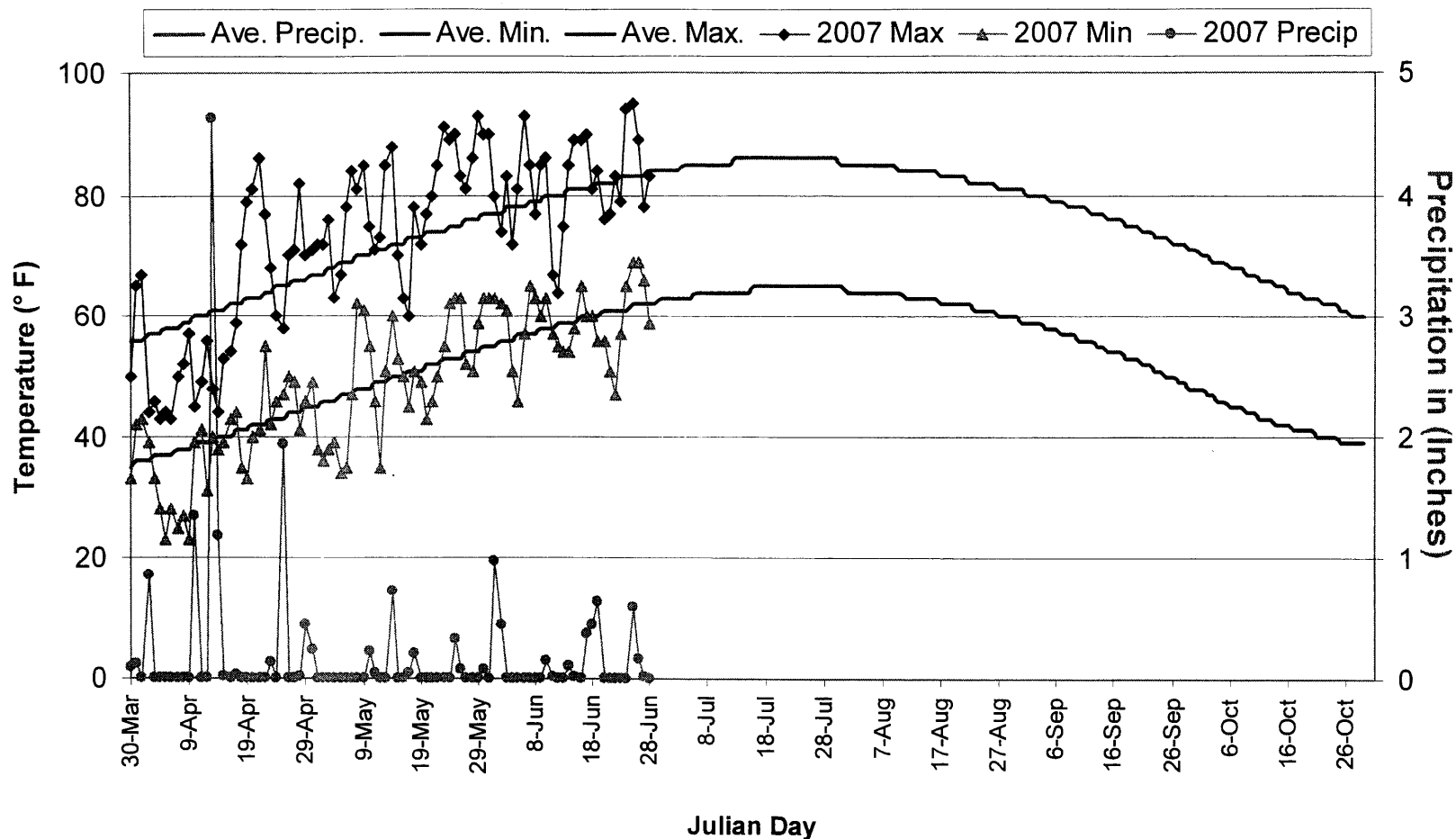
Region	<i>Aedes vexans</i>		<i>Culex Mix</i>		<i>Coquillettidia perturbans</i>		<i>Aedes sollicitans</i>	
	This Week	Average*	This Week	Average*	This Week	Average*	This Week	Average*
<b>Agricultural</b>	0.57	5.96	1.26	8.7	0.83	1.01	0.03	0.37
<b>Coastal</b>	5.92	6.94	1.37	8.47	0.05	2.59	4.41	18.65
<b>Delaware Bayshore</b>	0.00	6.18	0.00	27.05	0.00	10.87	0.00	11.32
<b>Delaware River Basin</b>	0.00	20.47	0.00	17.97	0.00	0.48	0.00	0.35
<b>New York Metro</b>	0.57	3.28	2.14	12.94	0.01	0.20	0.00	0.84
<b>North Central Rural</b>	0.02	0.90	0.02	1.89	0.06	0.08	0.00	0.00
<b>Northwest Rural</b>	0.07	13.00	0.52	5.32	0.14	0.14	0.00	0.00
<b>Philadelphia Metro</b>	3.14	14.69	2.19	10.44	0.09	1.63	0.00	0.00
<b>Pinelands</b>	1.47	4.69	1.10	5.88	1.60	1.25	0.05	0.16
<b>Suburban Corridor</b>	0.92	10.6	1.16	5.13	0.5	15.89	0.00	0.07

\* Averages represent data from, at most, the previous 5 years.

State Summary: *Aedes vexans* activity appears to be within recent historical trends (see Species pages) as does *Culex Mix* for most regions. *Coquillettidia perturbans* is showing a typical increase in activity. Heavy rains and recent lunar tides on June 30<sup>th</sup> should increase numbers of *Aedes sollicitans*. However, recent cool temperatures might limit numbers of mosquitoes in light traps this upcoming week.

*Climate Data*

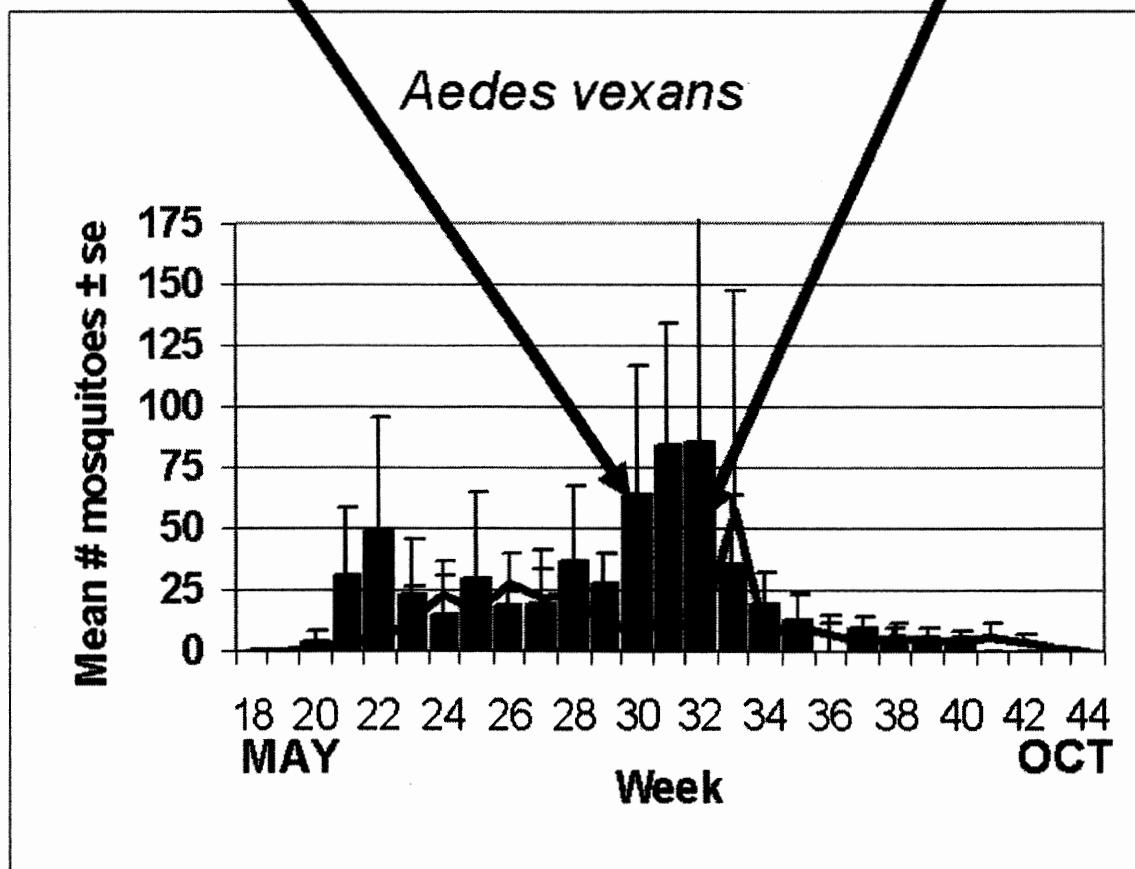
New Brunswick 1971-2000 Historical/Hillsborough 2007



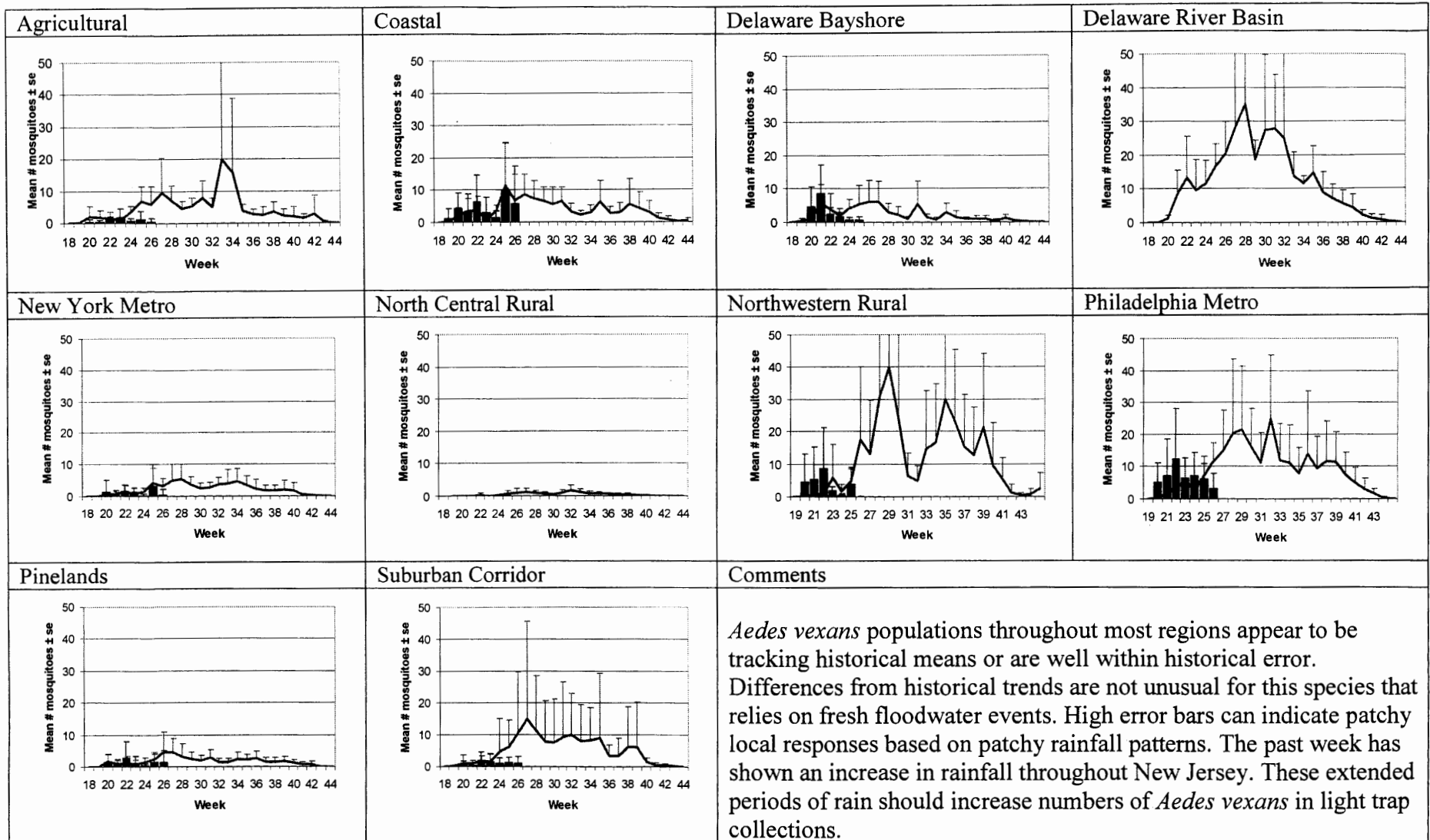
This figure shows historical average maximum and minimum temperatures and average precipitation recorded in the New Brunswick, NJ weather station over a recent 30 year period. Also graphed are the current year's minimum and maximum temperatures as recorded at the Hillsborough NJ weather station (a station close to central NJ which recorded all three parameters and was available online at the NJ state climatologist).

**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 plot shows 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 Week 26 are from Atlantic, Camden, Hudson, Mercer, Morris, Ocean, Passaic, Sussex, Union and Warren counties.

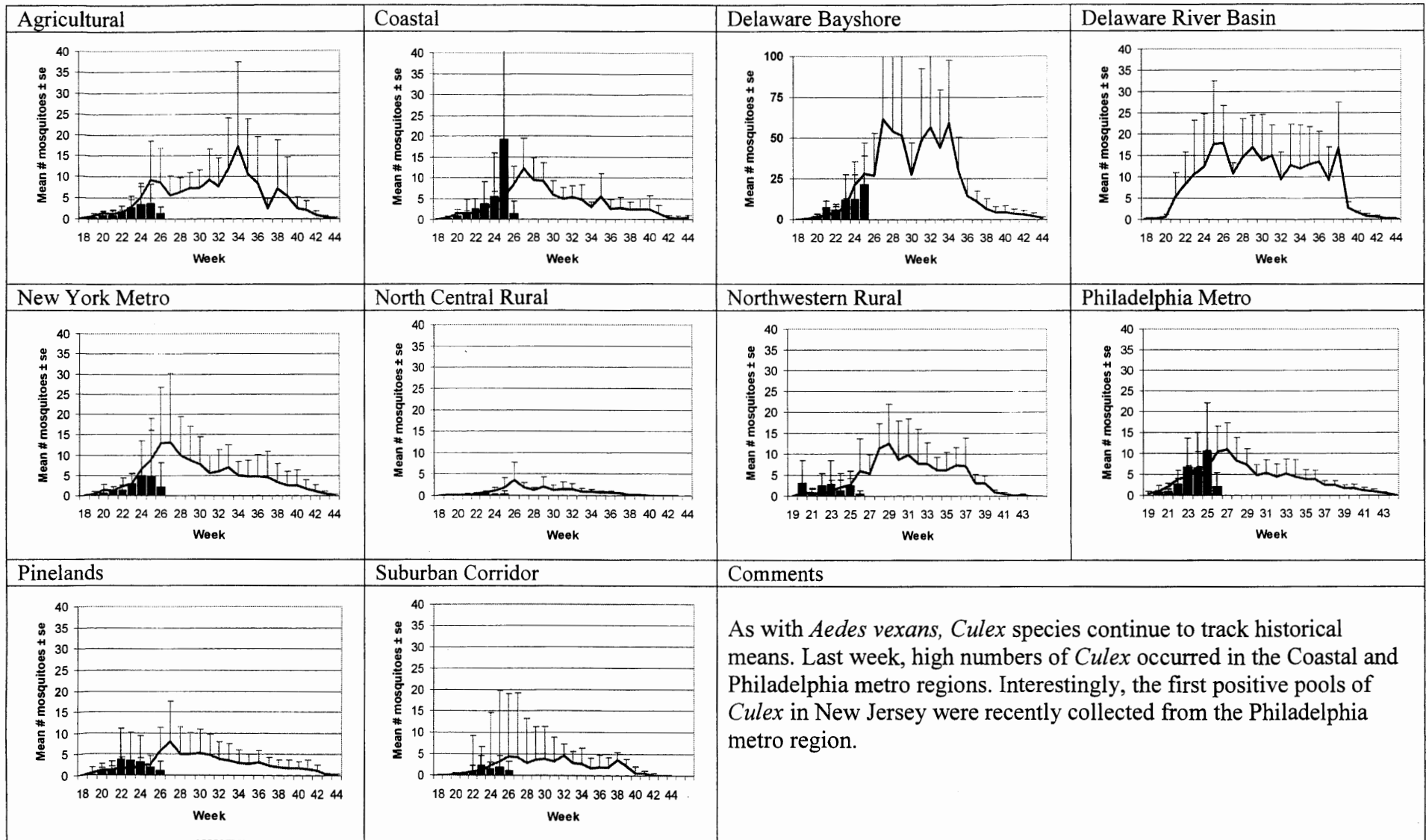
## Weekly Means Against 5-year Average



## *Aedes vexans* - Fresh Floodwater Species



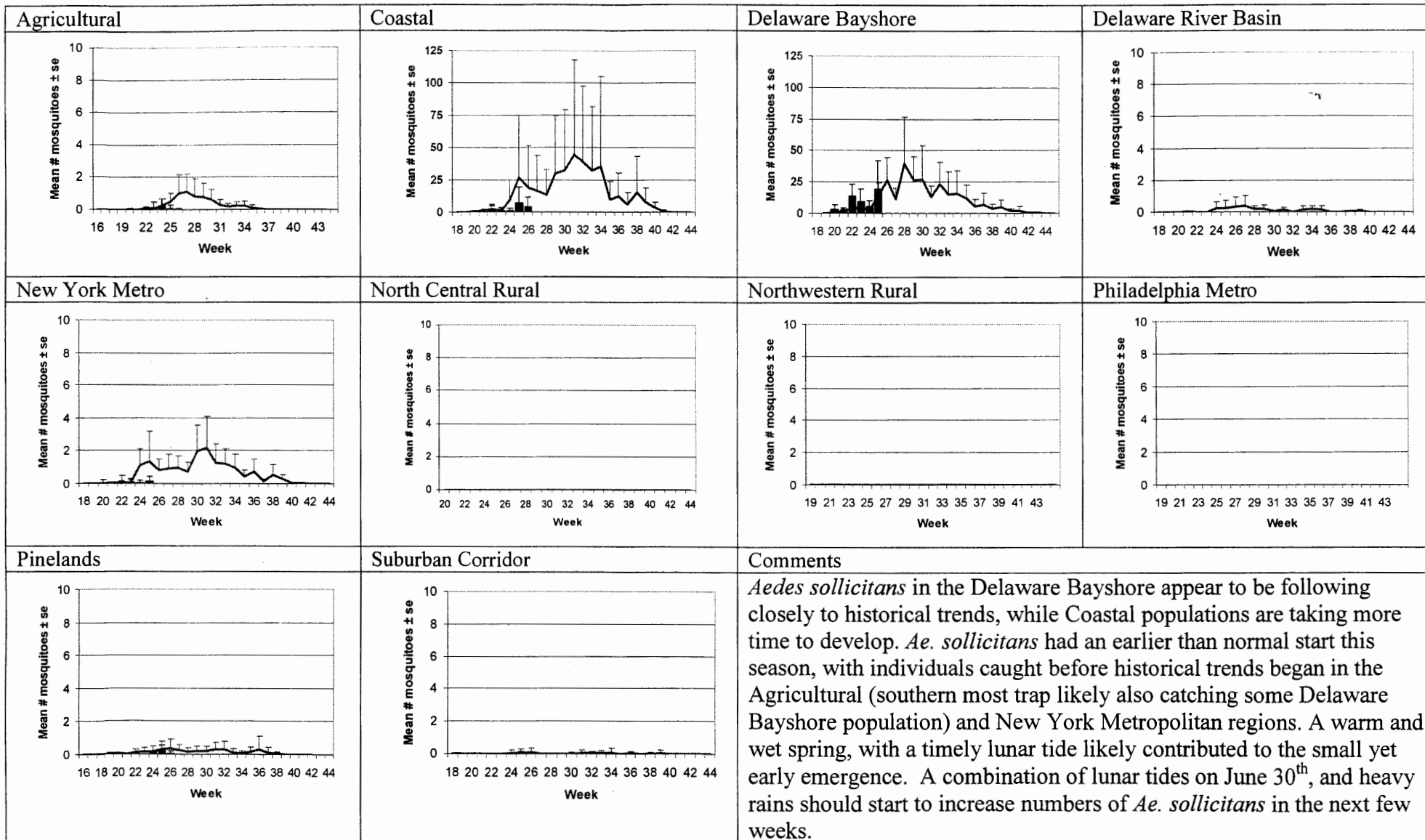
## *Culex* Mix - Multivoltine *Culex* Species



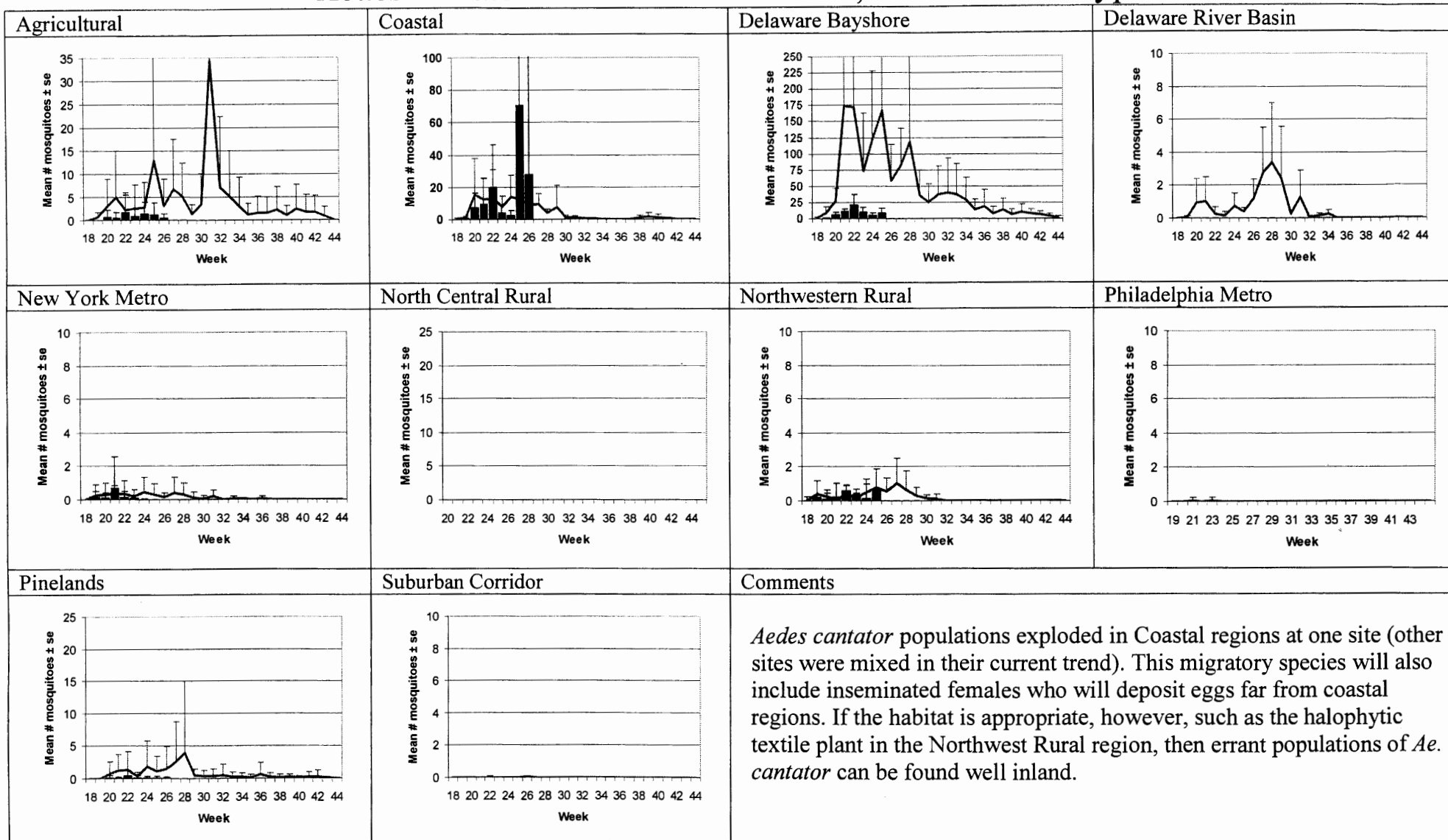
## *Culiseta melanura* – Miscellaneous Group

Agricultural	Coastal	Delaware Bayshore	Delaware River Basin
New York Metro	North Central Rural	Northwestern Rural	Philadelphia Metro
Pinelands	Suburban Corridor	Comments	
		<p><i>Culiseta melanura</i> populations in the two regions where previously high numbers emerged have returned toward historical levels. Resting box data also indicate a decline in numbers, but warm and humid conditions have helped maintain populations of <i>Culiseta melanura</i>. Small populations are seen in Agricultural, Philadelphia Metro and the Suburban Corridor.</p>	

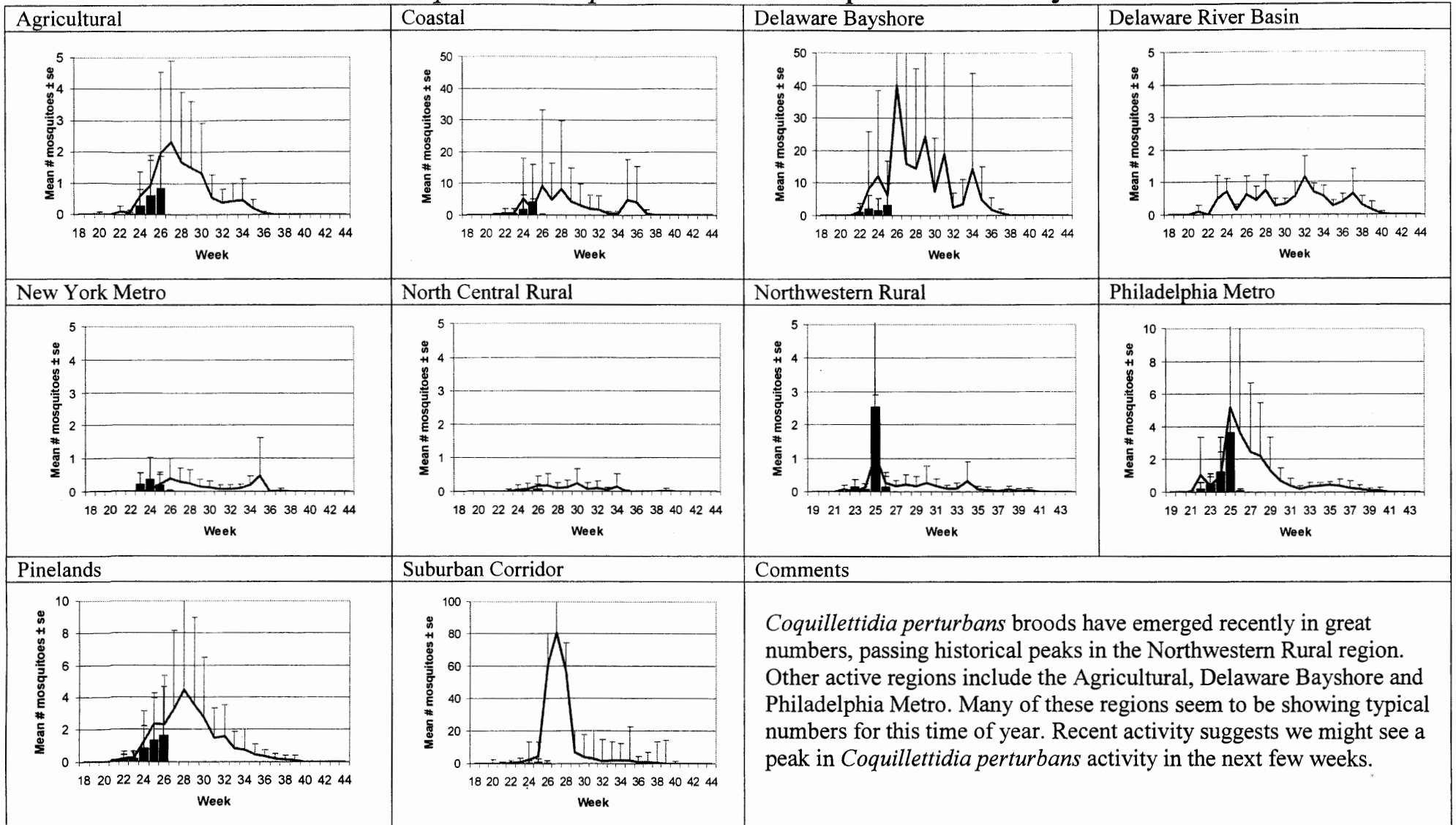
## *Aedes sollicitans* - Salt Marsh Floodwater Species



*Aedes cantator* – Multivoltine Aedine, *Ae. sollicitans* type



## *Coquillettidia perturbans* – Unique Life History



FINANCIAL STATEMENT  
STATE MOSQUITO CONTROL COMMISSION  
(FY'07)  
END-OF-YEAR REPORT \*

<b>FY'07 STATE MOSQUITO CONTROL, RESEARCH, ADMINISTRATION AND OPERATIONS APPROPRIATION</b>	<b>\$1,515,000.00</b>
<b>FY '06 Carry Forward</b>	<b>\$ 77,109.96</b>
<b>FY '06 Return; Rutgers Vector Surveillance</b>	<b>\$ 437.52</b>
 <b>FY'07 STATE MOSQUITO CONTROL COMMISSION</b>	 <b>\$1,348,254.48</b>

PROGRAMS/SERVICES	AMOUNT BUDGETED	EXPENDED	BALANCE
<b><u>Administration</u></b>	\$ 5,000.00	\$ 4,053.30	\$ 946.70
Parking Coupons (\$1,459.80)			
Legislative Index (\$325.00)			
NJMCA Proc. (\$100.00)			
MMWR (\$209.00)			
Mtg. Refreshment (\$137.50)			
NJMCA Exhib. (\$150.00)			
SOVE subscription (\$100.00)			
AMCA subscription (\$500.00)			
Printing - annual report (\$700.00)			
Travel - Ken Bruder (\$372.00)			
 <b><u>State Airspray Program</u></b>	 \$600,000.00	 \$549,040.29	 \$ 50,959.71
Insecticides (\$35,262.30)			
Insecticides (\$19,324.80)			
Insecticides (\$6,441.60)			
Zawicki Services (\$5,000.00)			
Downstown-July (\$33,088.40)			
Downstown-Aug. (\$35,820.30)			
Downstown-Sept. (\$30,976.93)			
Insecticides (\$12,883.20)			
Downstown - Mar. (\$3,498.00)			
Downstown - Apr. (\$25,005.36)			
Downstown - May (\$50,010.72)			
Downstown - June (\$75,016.08)			
Insecticides - (\$2,650.00)			
Insecticides - (\$12,883.20)			
Insecticides - (\$19,324.80)			
Insecticides - (\$25,766.40)			
Insecticides - (\$25,766.40)			
Insecticides - (\$25,766.40)			
Insecticides - (\$25,766.40)			
Insecticides - (\$25,766.40)			
Insecticides - (\$625.00)			
Downstown - June (\$3,164.00)			
Downstown - Balance (\$75,000.00)			

- *Final Report conditional in anticipation of end-of-year, close-out reports from Rutgers Service Contracts.*

<b><u>Equipment Repairs/Purchases</u></b>	<b>\$200,000.00</b>	<b>\$ 158,503.47</b>	<b>\$ 41,496.53</b>
Lettering (\$370.00)			
Atlantic Rot. Rep (\$337.09)			
Atlantic Rot. Rep. (\$2,000.00)			
Sussex Truck Rep. (\$3,425.86)			
Ocean Rot. Rep. (\$40,000.00)			
Salem Hyd. Ex. Rep. (\$6,998.73)			
Warren Trailer rep. (\$2,784.18)			
Microscope repair (\$135.00)			
Ocean boat motor (\$5915.00)			
Fish tank parts (\$425.40)			
Salem L.R. Hyd. Ex. Rep. (\$46,000.00)			
Cumberland Hyd Ex. Rep. (\$667.12)			
Truck cap (\$725.00)			
Warren Excav. Weight (\$3,267.46)			
Warren Excav. Bucket (\$1,481.25)			
ULV machine – Essex (\$15,405.00)			
ULV machine – (\$16,716.38)			
ULV machine – Atlantic (\$11,850.00)			
<b><u>Education and Information</u></b>			
Toll-free Number	\$ 10,000.00	\$ 167.94	\$ 9,832.06
Certifications/Training	\$ 12,265.00	\$ 0.00	\$ 12,265.00
<b><u>MOA'S</u></b>			
DH/SS WNV Testing	\$ 145,000.00	\$ 81,270.12	\$ 63,729.88
Mosquitofish Program	\$ 25,000.00	\$ 25,000.00	\$ 0.00
Biological Control-copepods	\$ 25,000.00	\$ 25,000.00	\$ 0.00
<b><u>Research-Trans. Cycle WNV</u></b>	\$ 2,000.00	\$ 0.00	\$ 2,000.00
<b><u>Professional Services</u></b>	\$ 246,442.00	\$ 246,442.00	\$ 00.00
Vector Surveillance (\$162,195.00)			
Monitor of Insecticides (\$53,414.00)			
Statewide Surveillance (\$30,833.00)			
<b><u>Uncommitted</u></b>	\$ 77,547.48	\$ 0.00	\$77,547.48
<b><u>TOTALS AS OF 7/17/07</u></b>	<b>\$1,348,254.48</b>	<b>\$1,089,477.12</b>	<b>\$ 258,777.36</b>

**COMMISSION-SUPPORTED PUBLICATIONS AND PRESENTATIONS  
JULY 1, 2006 – JUNE 30, 2007**

**Bartlett, K. 2007.** Phoutaxis Towards Amphibian Vocalizations is *Culex territans*. *Proc. New Jersey Mosquito Control Association*. In Press.

**Brattsten, L. 2007.** Mosquito Larvicides in New Jersey. *Proc. New Jersey Mosquito Control Association*. In Press.

**Kent, R. 2007.** A Report of the NJ State Mosquito Control Commission and the Office of Mosquito Control Coordination. *Proc. New Jersey Mosquito Control Association*. In Press.

**Reed, L and W. Crans, R. Gaugler and R. Kent. 2007.** Adult Mosquito and Vector Surveillance in New Jersey, 2006. *Proc. New Jersey Mosquito Control Association*. In Press

**Reed, L. 2006.** The State and Vector Surveillance Report for New Jersey, 2006. Presented 52<sup>nd</sup> Annual Meeting, Northeastern Mosquito Control Association.

**Reed, L. 2007.** The New Jersey Vector Surveillance Program, 2006. *Proc. New Jersey Mosquito Control Association*. In Press.

**Reed, L. 2007.** The New Jersey Adult Mosquito Surveillance Program, 2006. *Proc. New Jersey Mosquito Control Association*. In Press.

**Sun, D. and L. Brattsten. 2007.** Catochrome 450 Reductase. *Proc. New Jersey Mosquito Control Association*. In Press.

**PRESENTATIONS**

**Reed, L. 2006.** Northeastern Mosquito Control Association 2006 Annual Meeting, Saratoga, NY, Vector and Adult Mosquito Surveillance in New Jersey, 2006

**Reed, L. 2007.** New Jersey Mosquito Control Association 2007 Annual Meeting Atlantic City, NJ, Annual Meeting, Saratoga, NY, Vector and Adult Mosquito Surveillance in New Jersey, 2006.