



NEW JERSEY STATE MOSQUITO CONTROL COMMISSION



A STATE MOSQUITO SURVEILLANCE PROGRAM FOR NEW JERSEY

FINAL WEEKLY REPORT FOR 2005 – SPECIES SUMMARIES

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**new jersey
agricultural experiment station**

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NEW JERSEY STATE SURVEILLANCE

Final Weekly Report for 2005

Including data for the week ending 31 October.

Submitted by Lisa Reed

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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.

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Figure 1a: Map of ten regions selected for the New Jersey Surveillance Program overlaid with county borders.



Figure 1b. Trap lat-long locations.



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 2005 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 at the previous weeks' report than during the current week. Care must be taken with the interpretation of the most current week's data.

Weather affected the trap catches considerably in 2005. Last year, a total of 42 species in 330,000 individuals were caught in the light traps throughout New Jersey. This year, after a cold spring and dry summer, only 220,910 mosquitoes from 35 species were recorded in the same light traps. Last year, species abundance was high in the Agricultural and Pinelands regions. This year, species abundance fell to moderate levels in the Agricultural region. The Delaware Bayshore and Pinelands regions continue to represent the low and high values of species diversity, respectively. The difference between total species caught in New Jersey and the highest number found per region indicate the diversity of species found from one end of the state to the other.

Region	Number of Traps	Number of Species
Agricultural	6	26
Coastal	9	30
Delaware Bayshore	6	19
Delaware River Basin	4	25
New York Metro	10	26
North Central Rural	8	19
Northwestern Rural	6	23
Philadelphia Metro	6	21
Pinelands	11	33
Suburban	17	29
Total	83	35

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 2 or 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 2005: The mosquitoes collected in county operated light traps belong to a series of very different life cycle types as described by 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. We present the seasonal data for the 26 species from last year's report.

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: *Oc. stimulans*, *Oc. canadensis*, *Oc. sticticus* & *Oc. 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*, *Oc. 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: *Oc. sollicitans* & *Oc. 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: *Oc. triseriatus* & *Oc. japonicus*.

Multivoltine Culex/Anopheline (quadrimaculatus) 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. quadrimaculatus*, *Cx. territans* & *Cx. erraticus*.

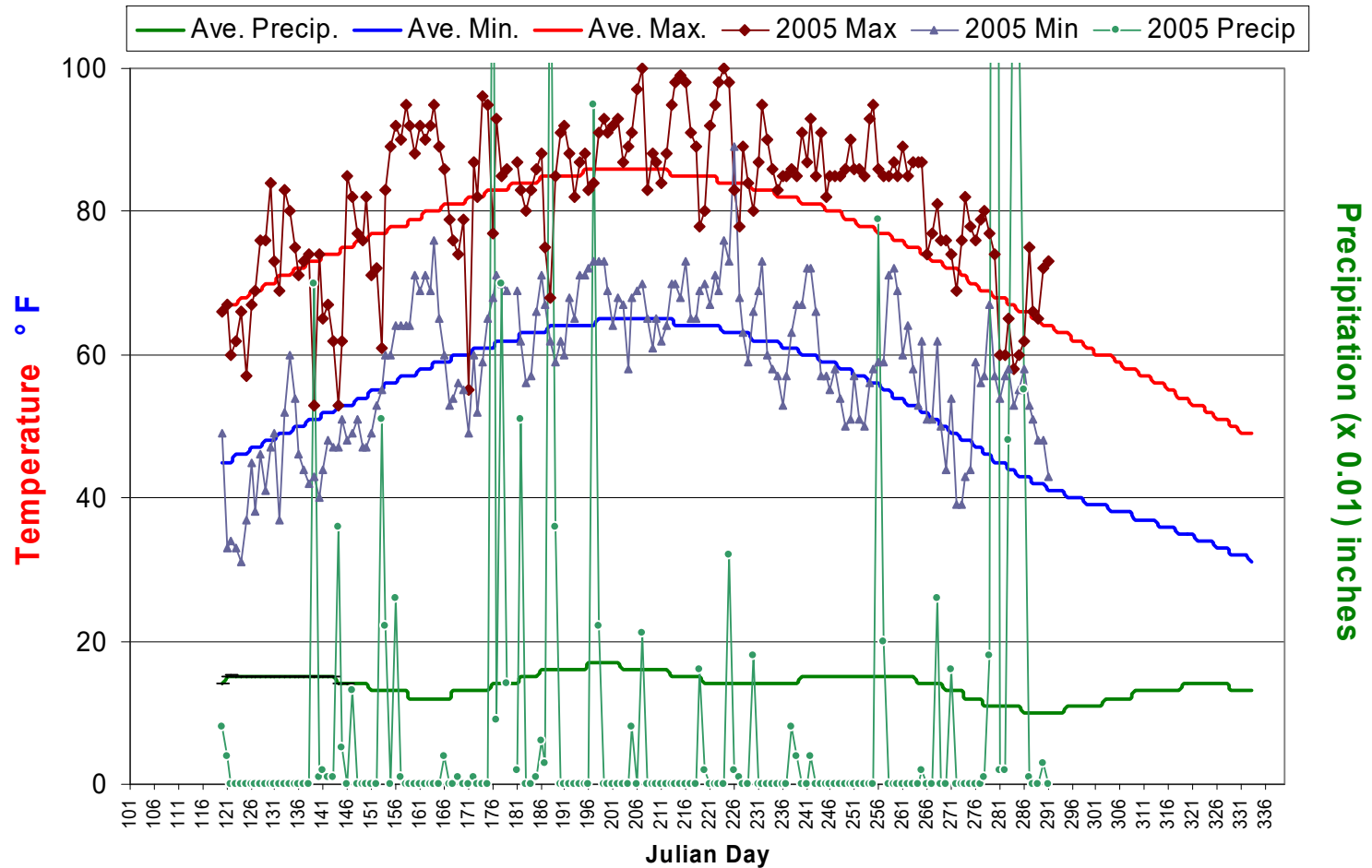
Multivoltine Culex/Anopheline (salinarius) Species: Members of this group overwinter as mated females that will lay eggs in a variety of brackish water, showing a wide degree of salt tolerance. Larvae generally reach highest numbers in brackish water and with multiple generations, the populations can 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*.

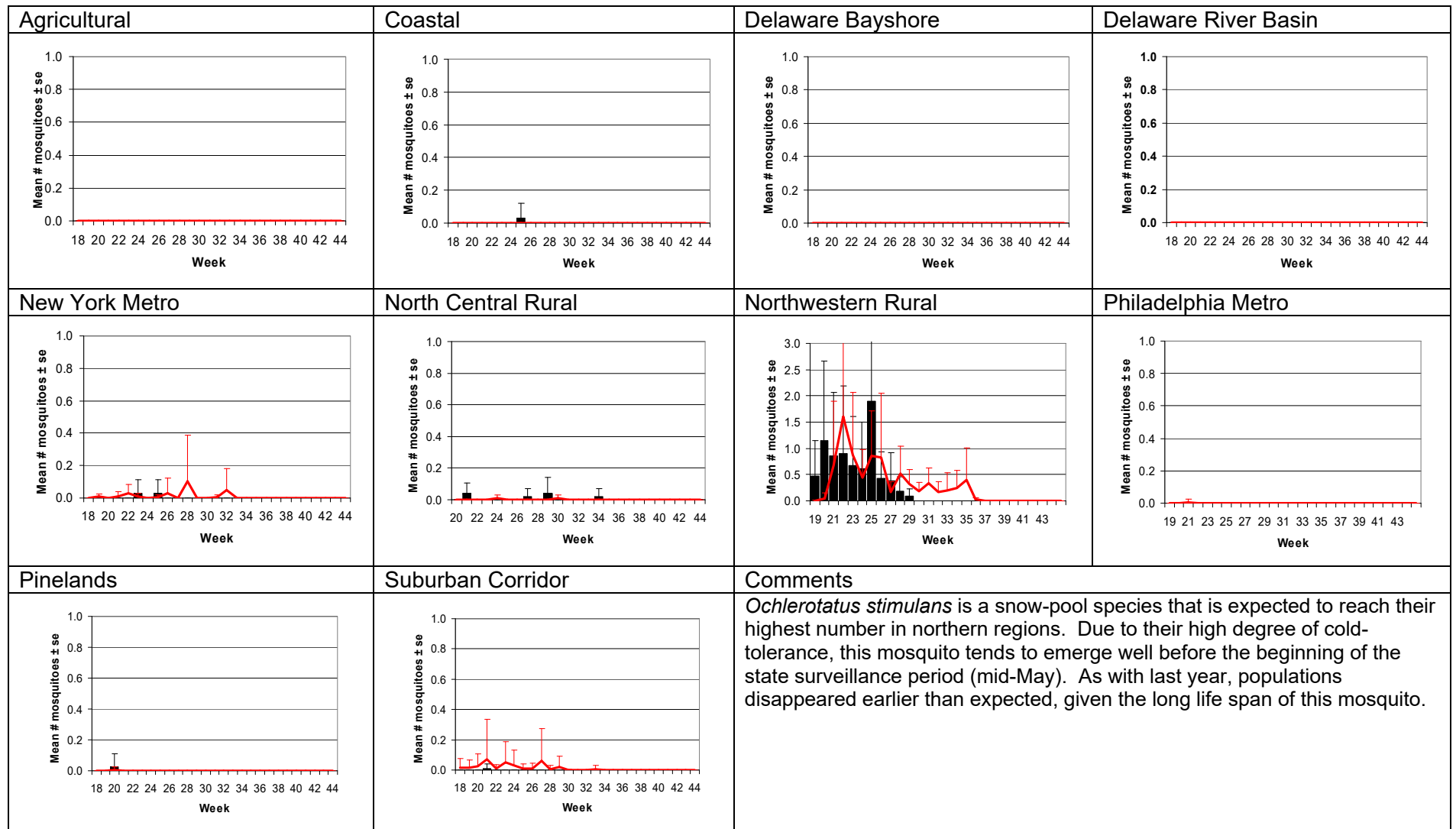
Climate Data

New Brunswick 1971-2000 Historical/Hillsborough 2005

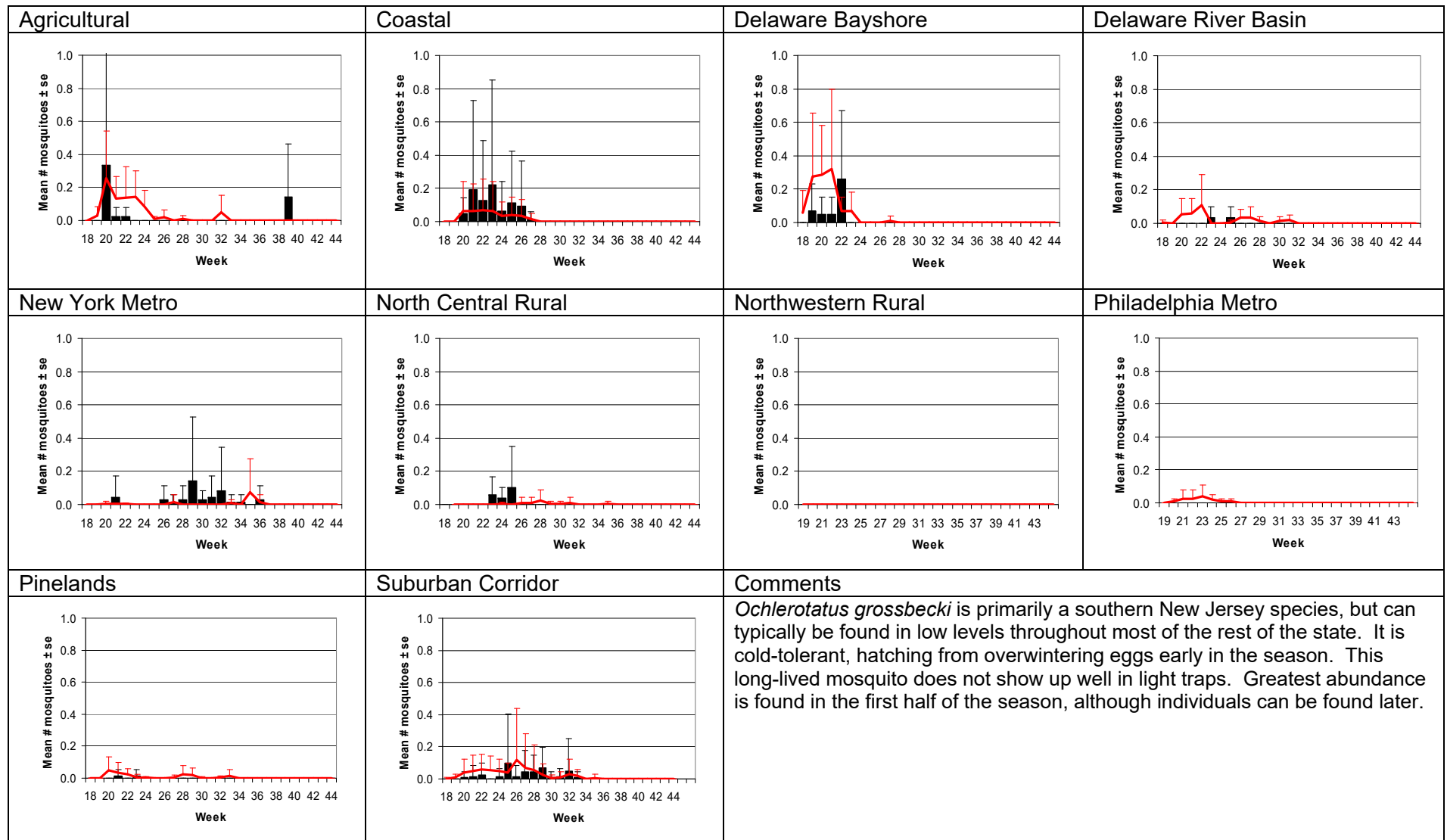


This figure shows historical average maximum and minimum temperatures and average precipitation recorded in the New Brunswick, NJ weather station over a recent 30 year period. Also graphed are the current year's minimum and maximum temperatures as recorded at the Hillsborough NJ weather station (a station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

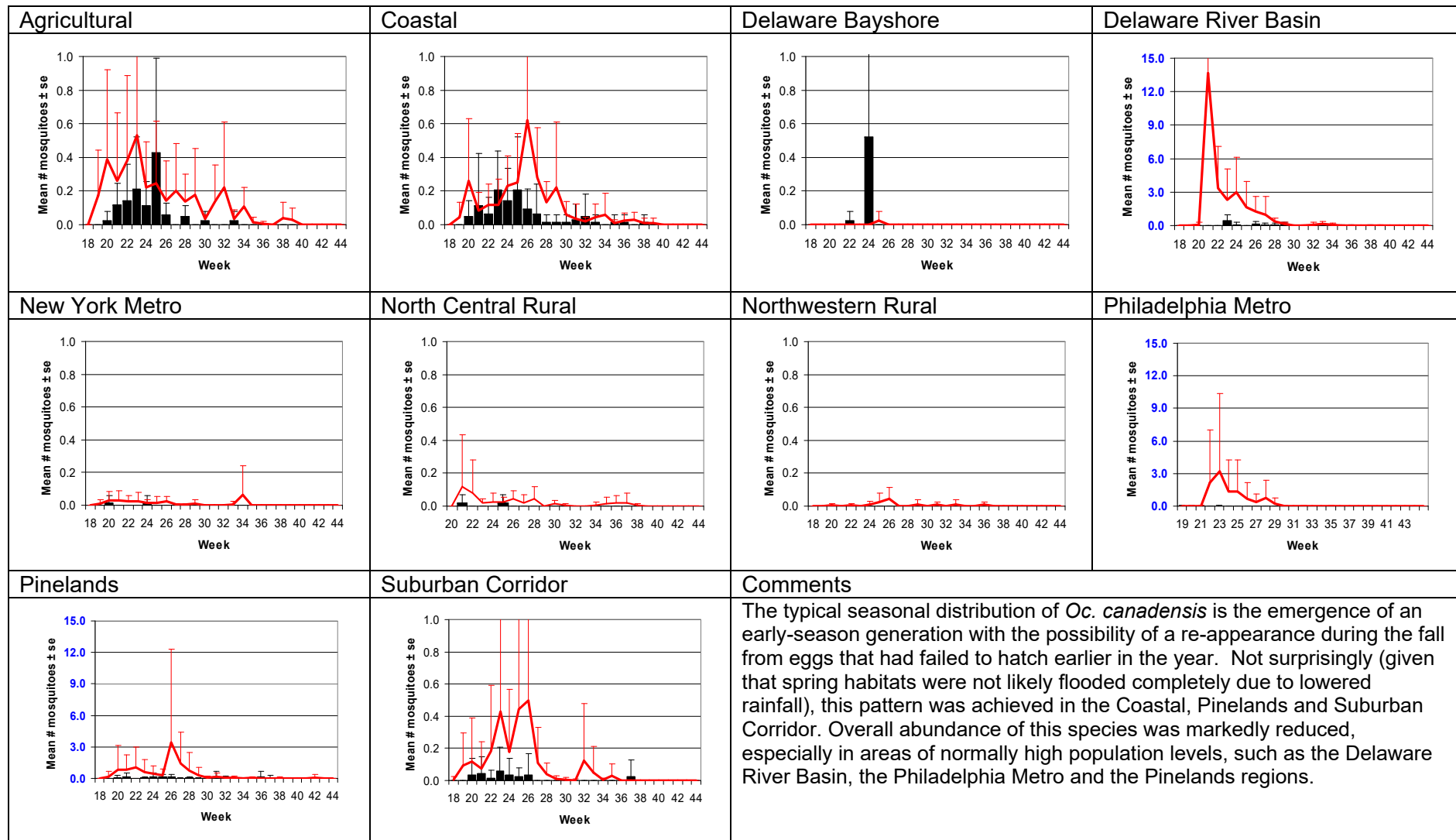
Ochlerotatus stimulans – Early Season Species



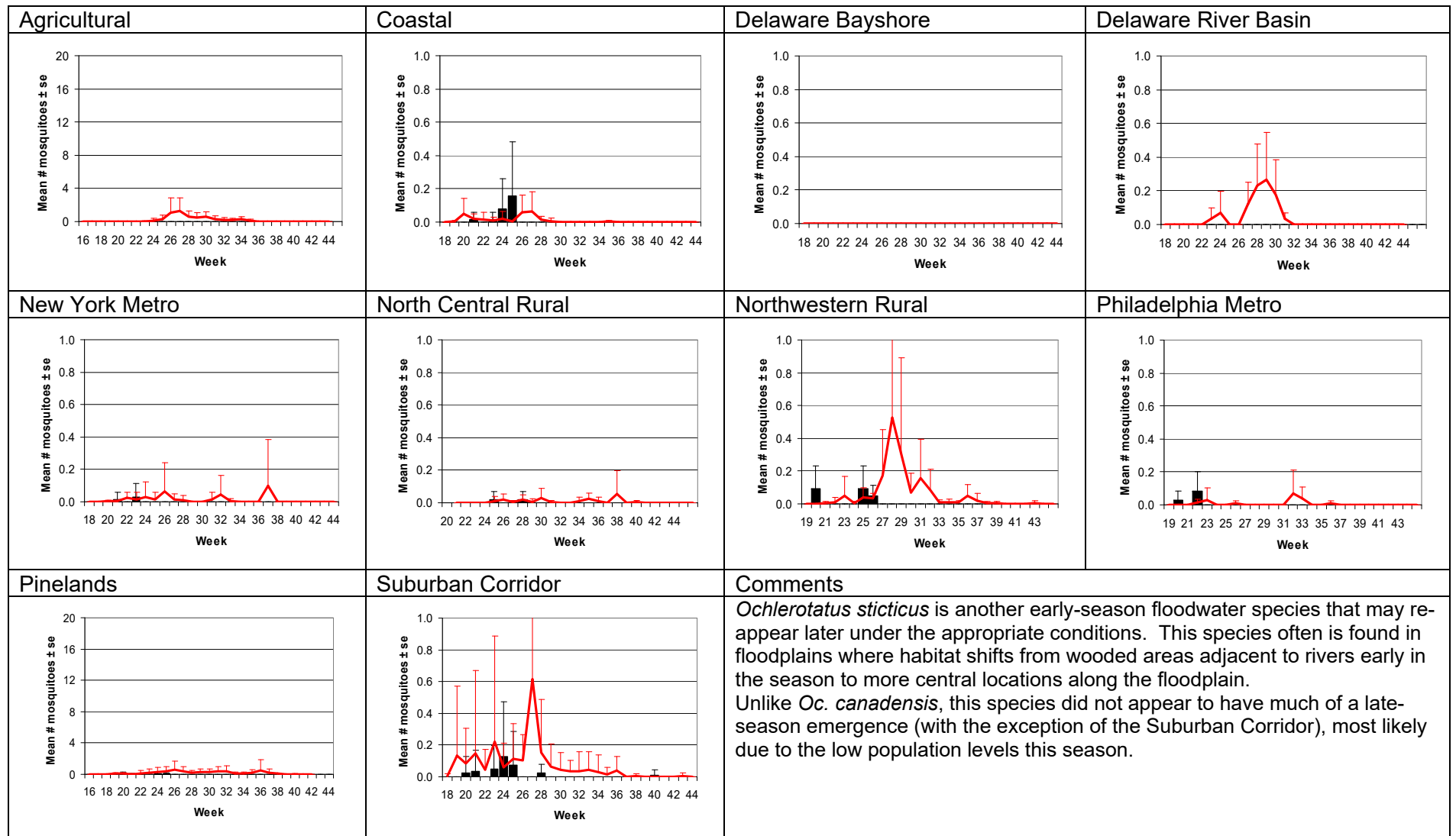
Ochlerotatus grossbecki – Univoltine Aedine (*stimulans*) Species



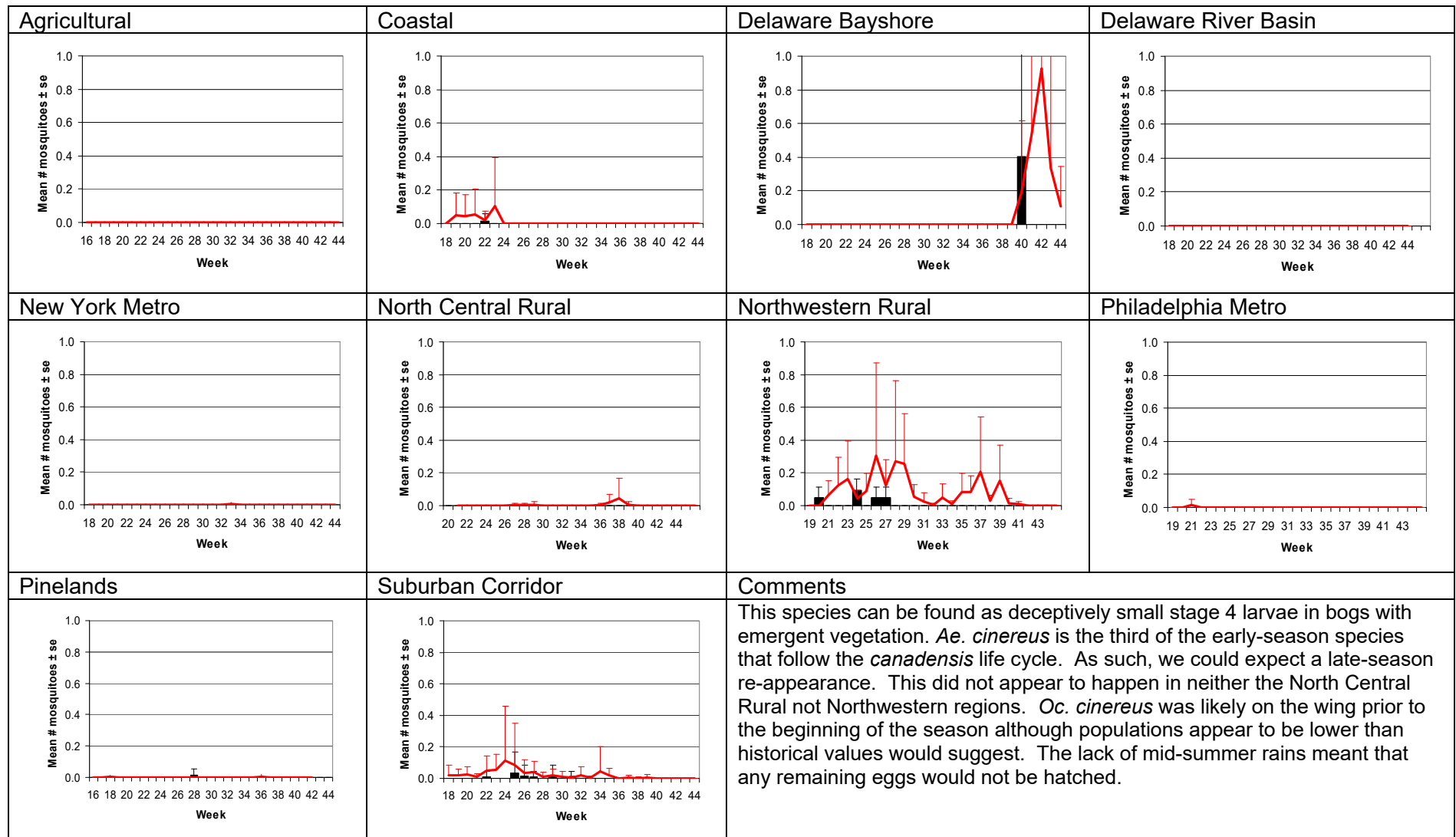
Ochlerotatus canadensis – Early Season Species



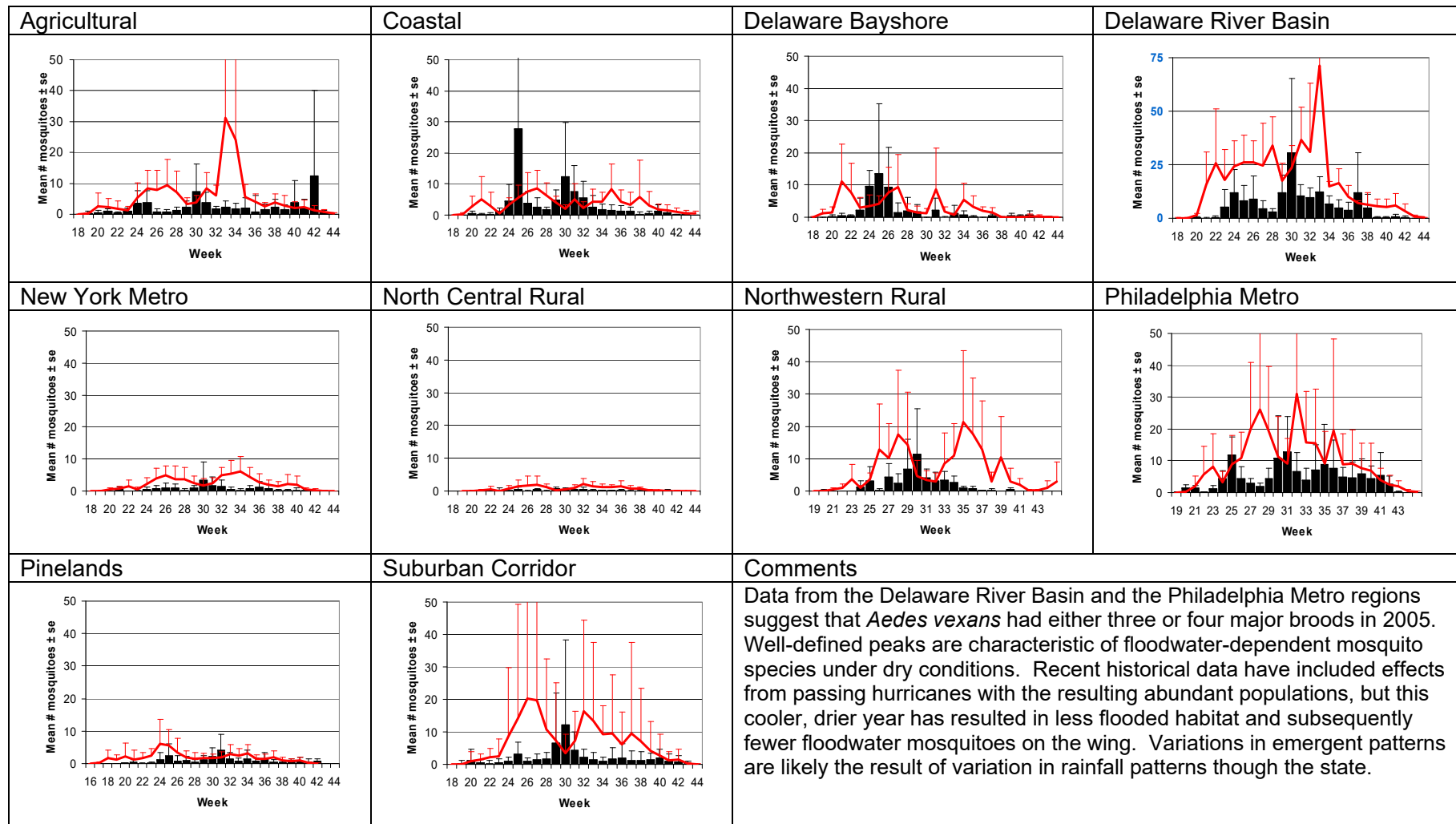
Ochlerotatus sticticus – Early Season Species



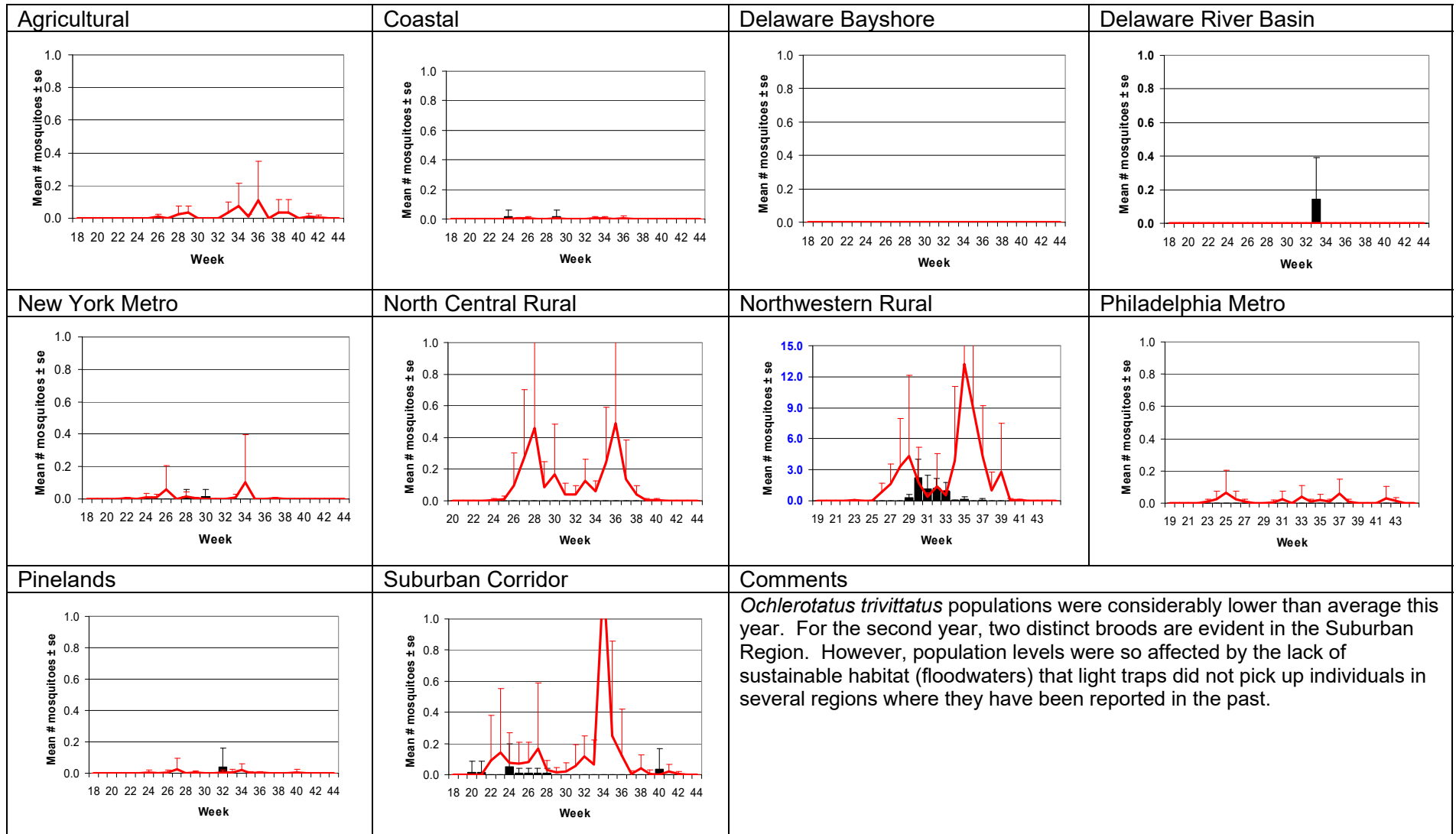
Aedes cinereus – Early Season Species



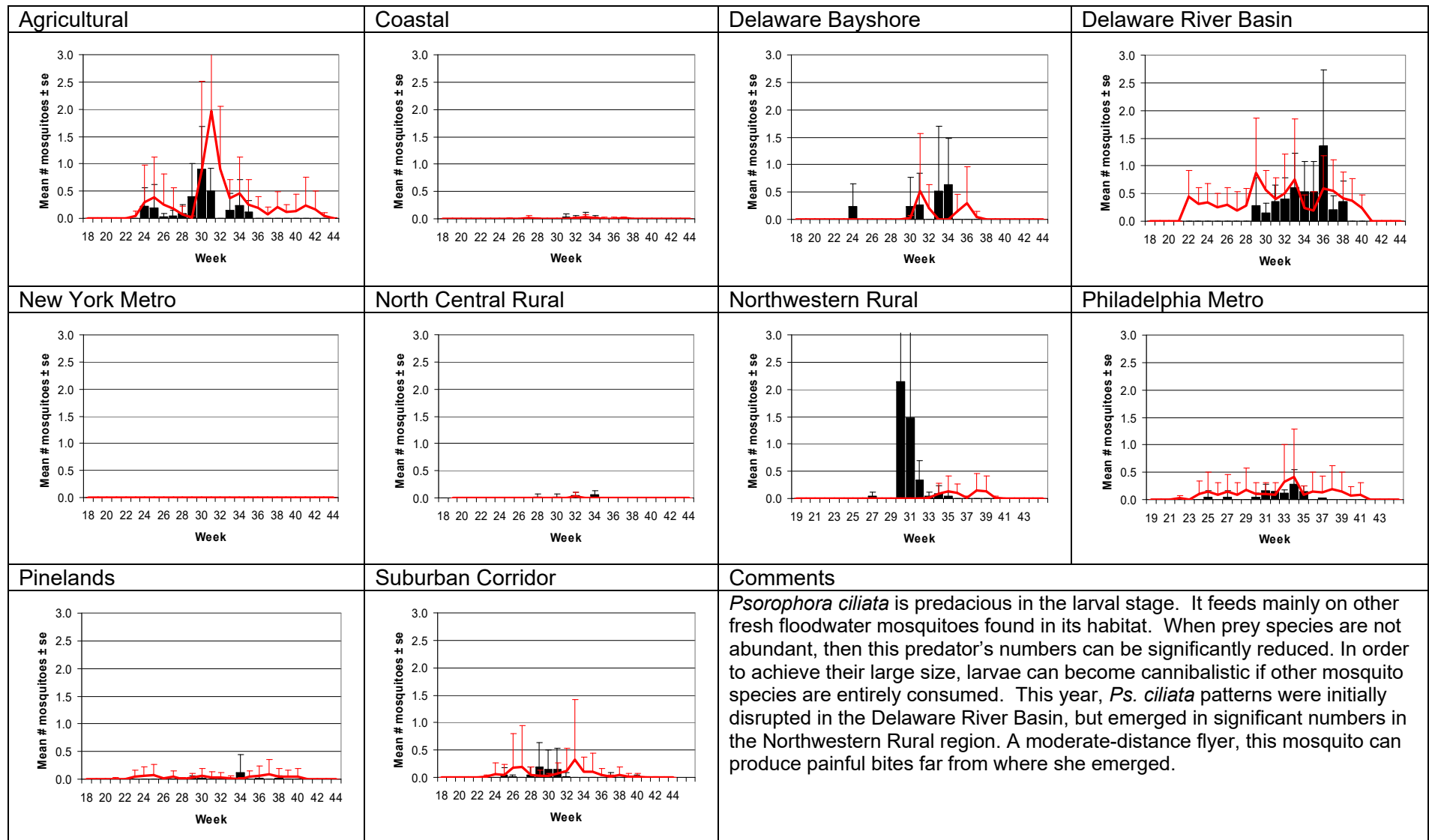
Aedes vexans - Fresh Floodwater Species



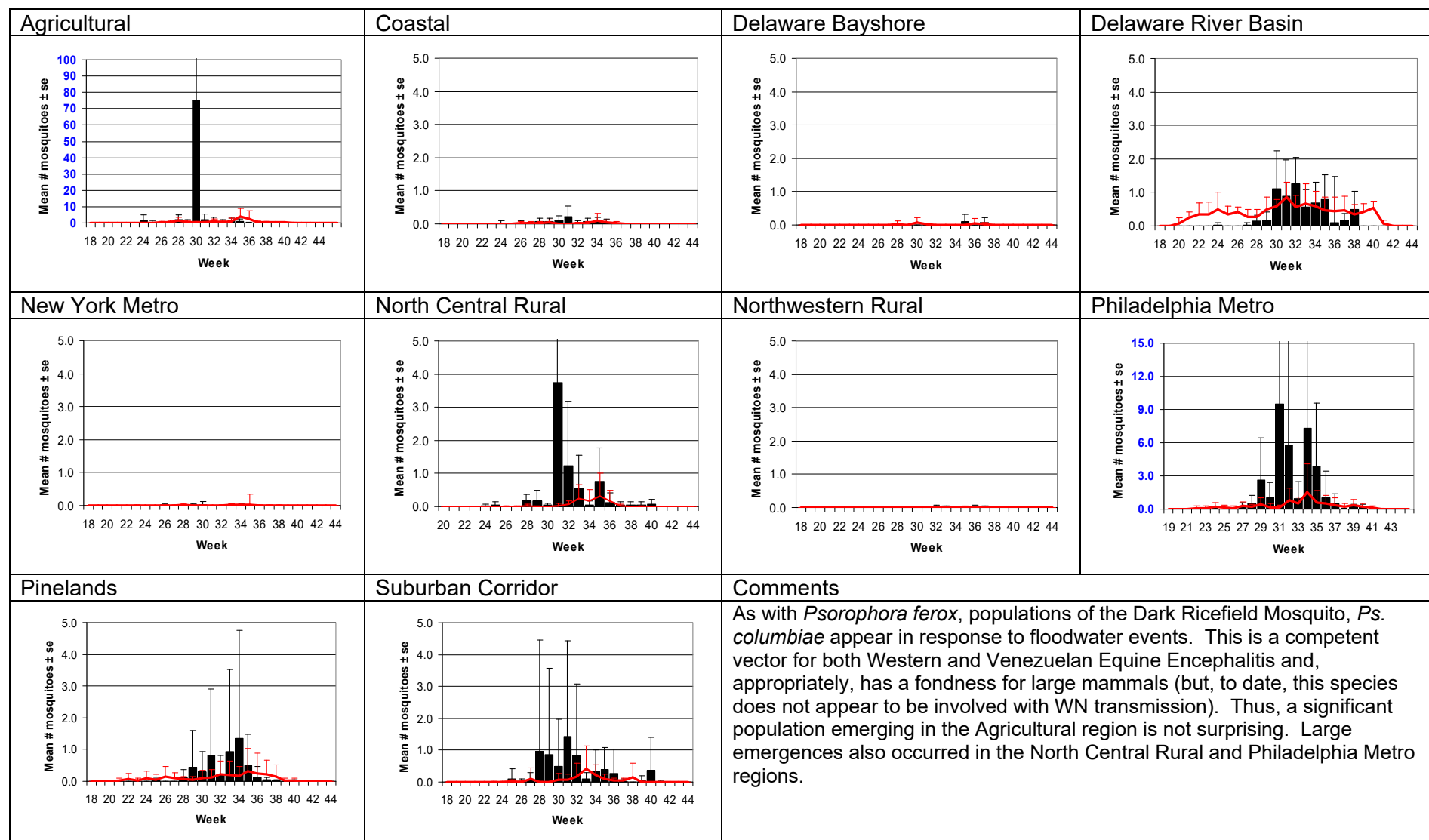
Ochlerotatus trivittatus – Multivoltine Aedine (*vexans*) Species



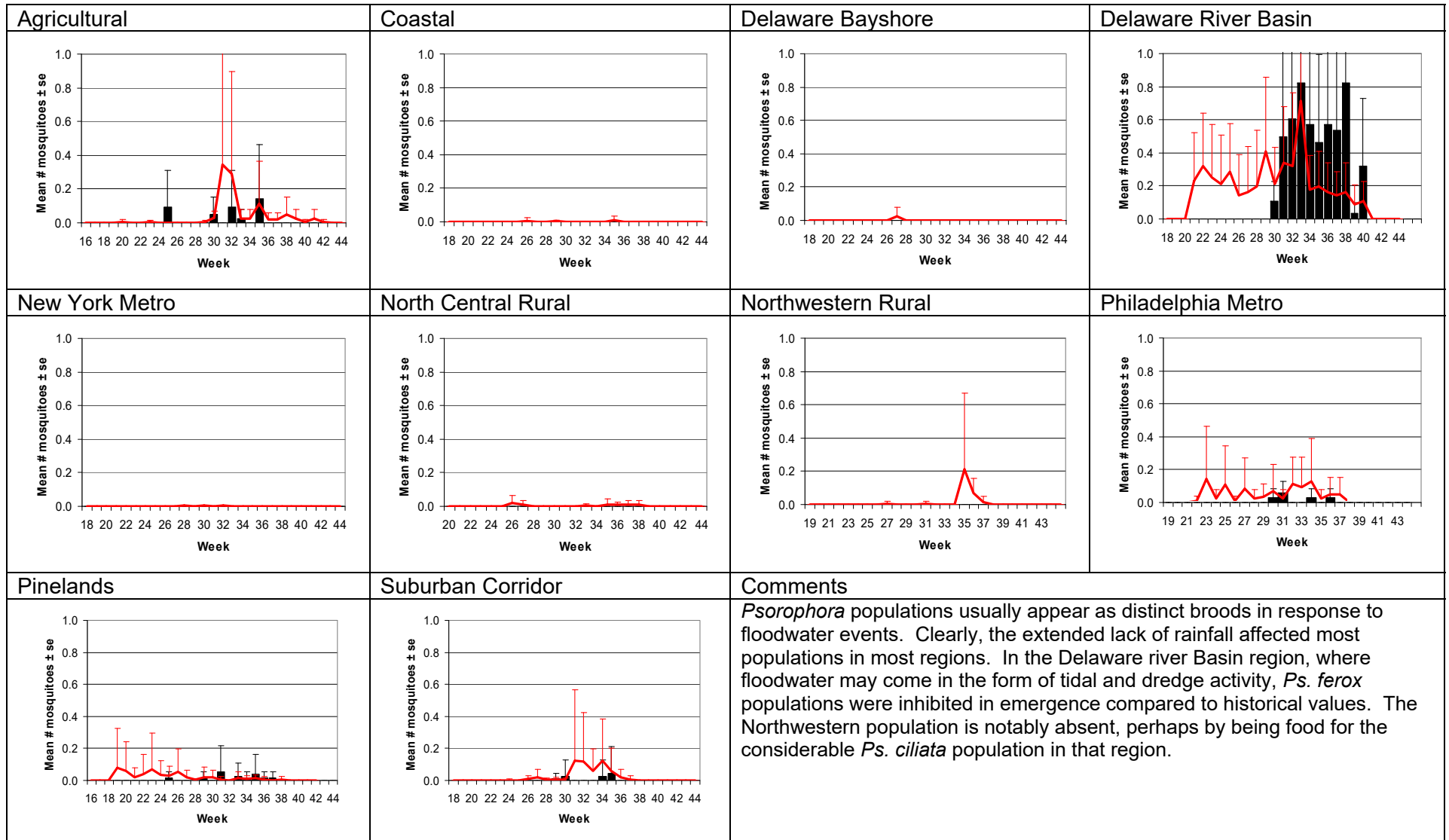
Psorophora ciliata – Multivoltine Aedine (*vexans*) Species



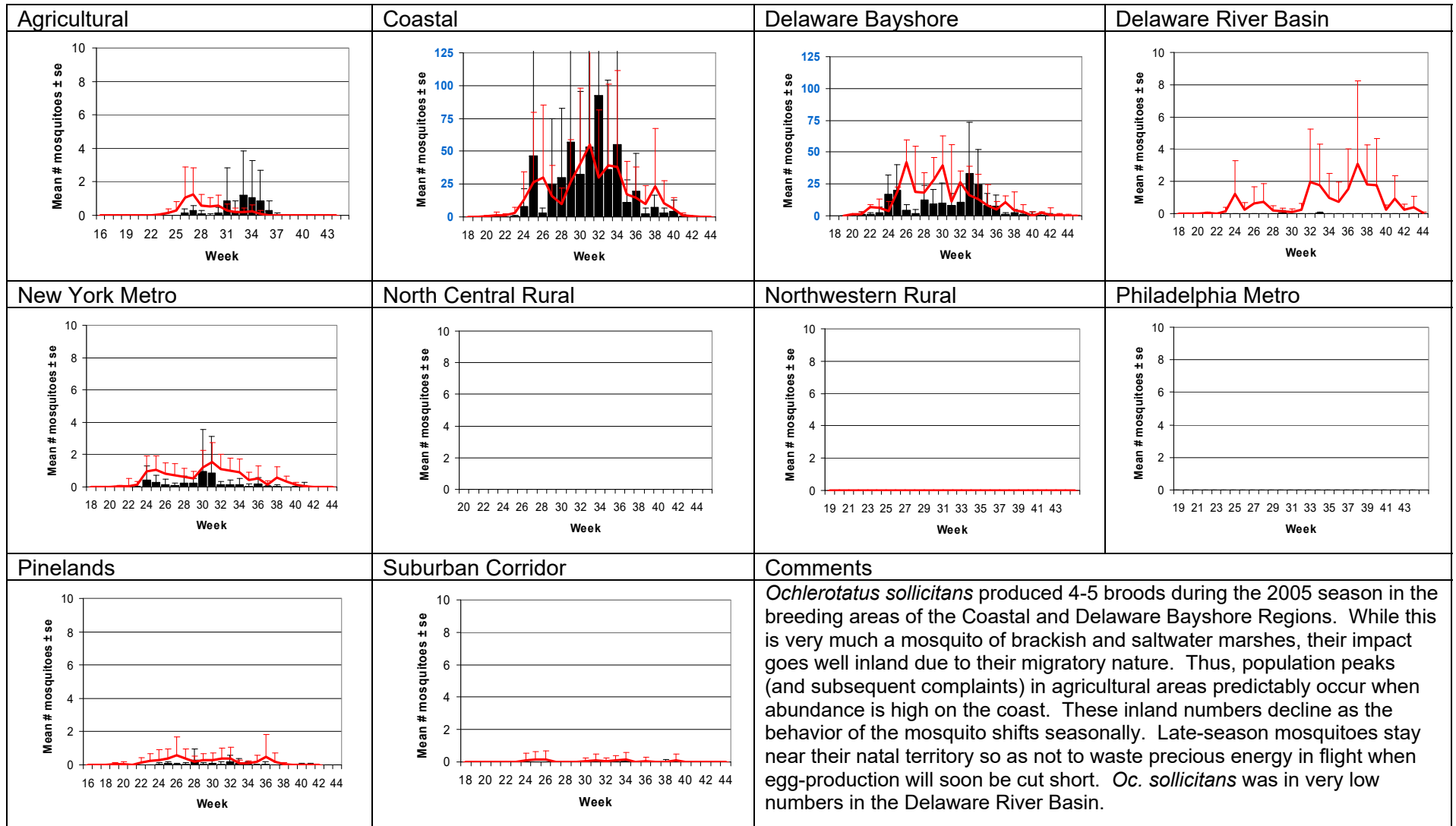
Psorophora columbiae– Multivoltine Aedine (*vexans*) Species



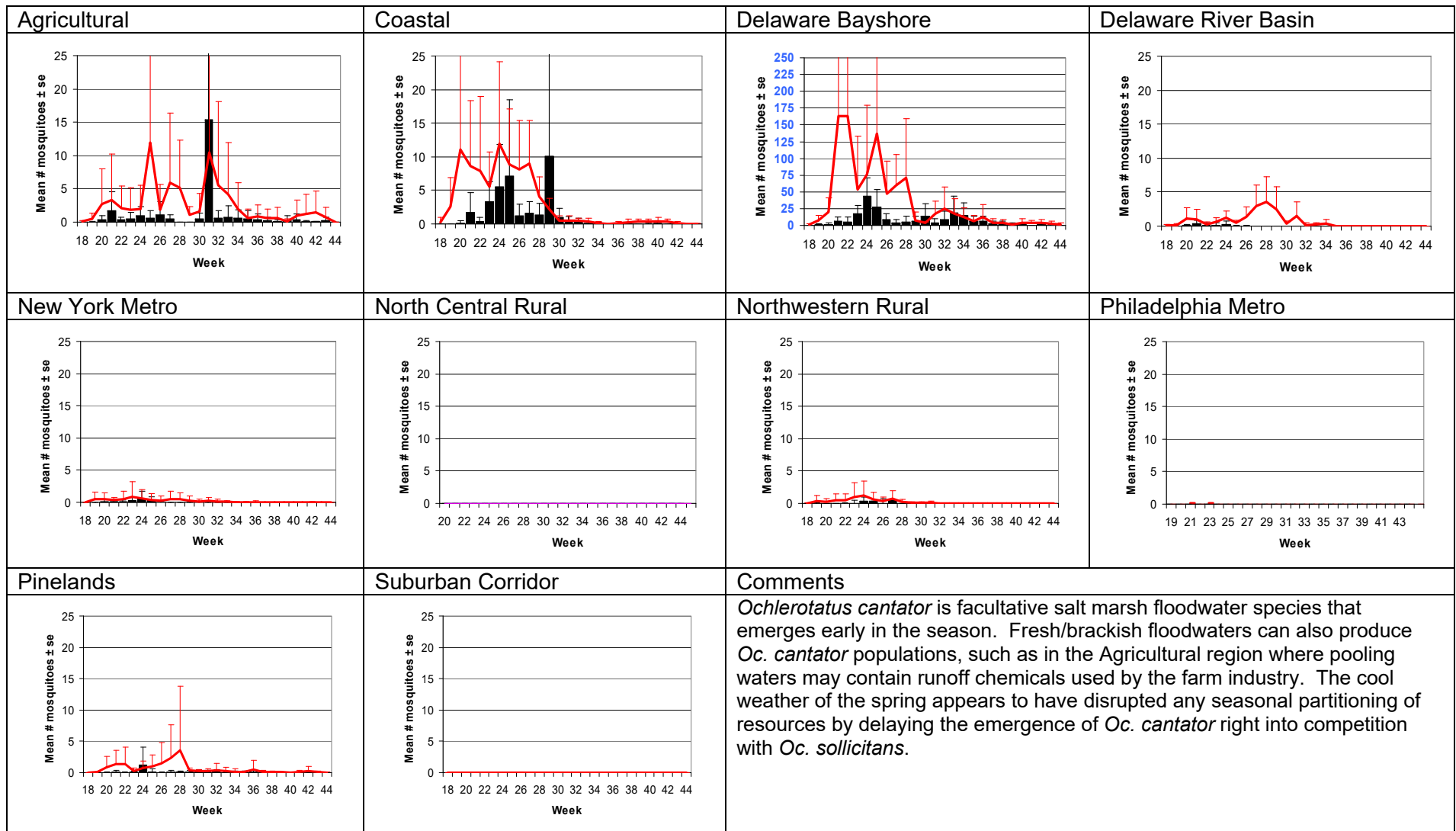
Psorophora ferox – Multivoltine Aedine (*vexans*) Species



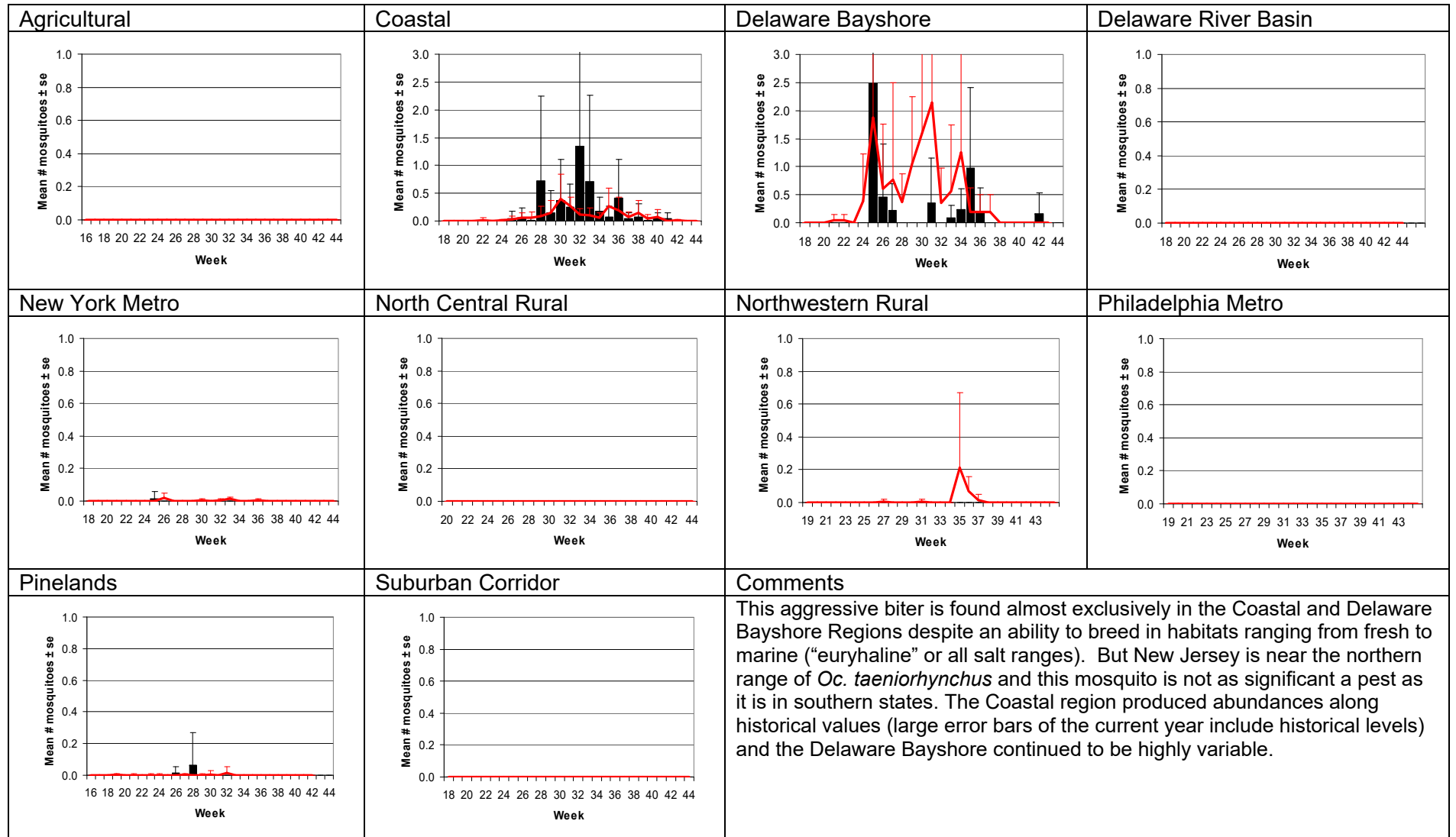
Ochlerotatus sollicitans - Salt Marsh Floodwater Species



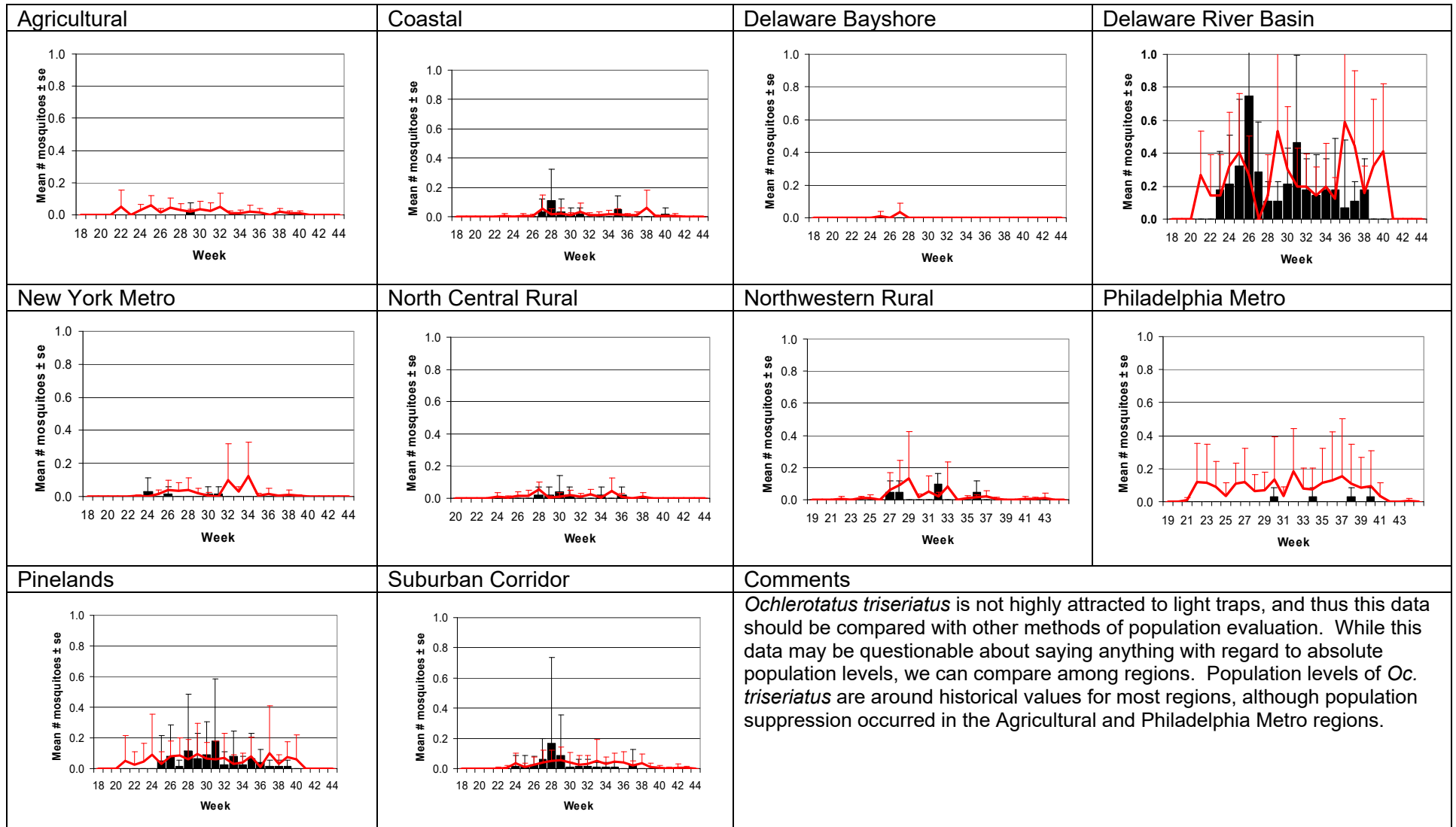
Ochlerotatus cantator – Salt Marsh Floodwater Species



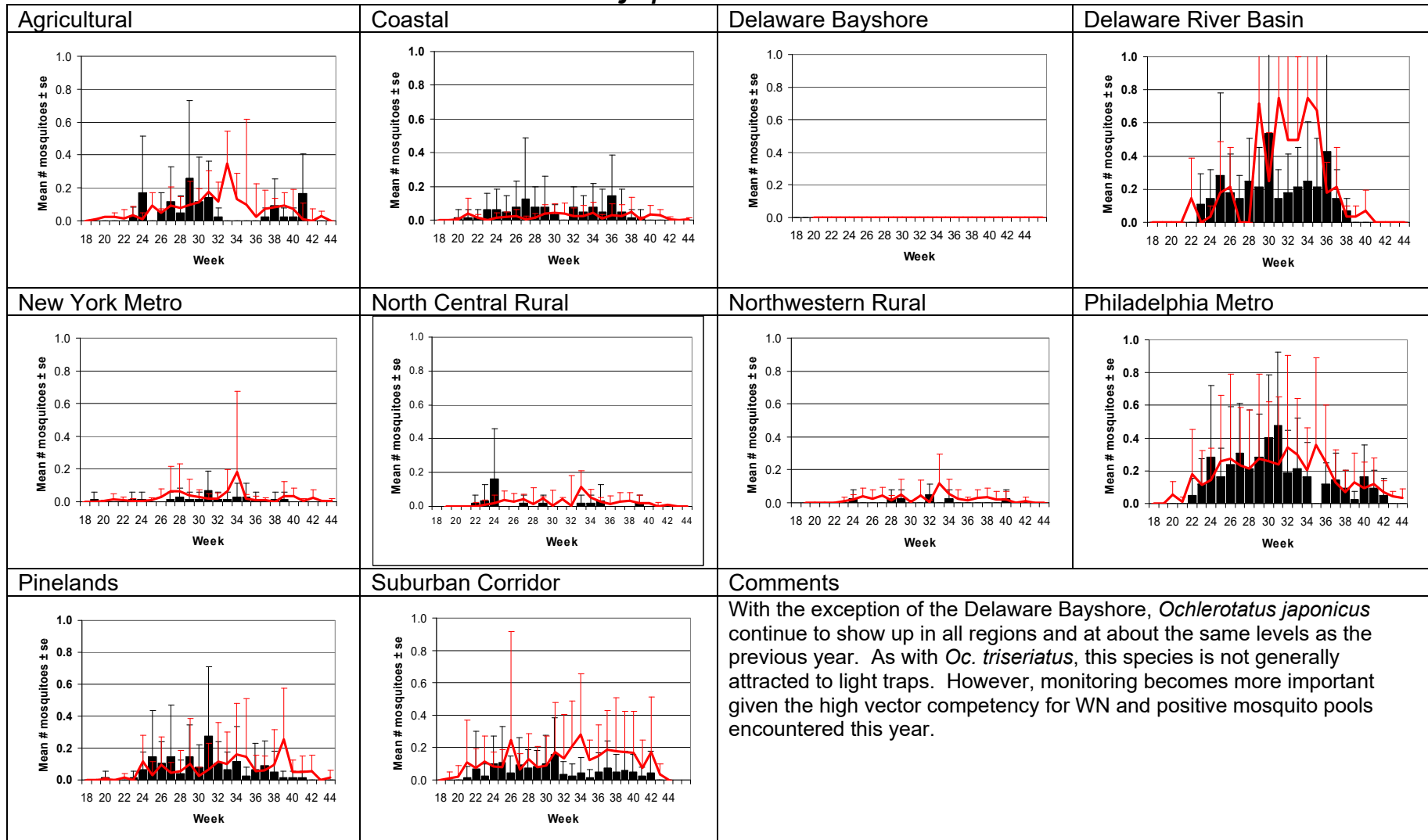
Ochlerotatus taeniorhynchus – Salt Marsh Floodwater Species



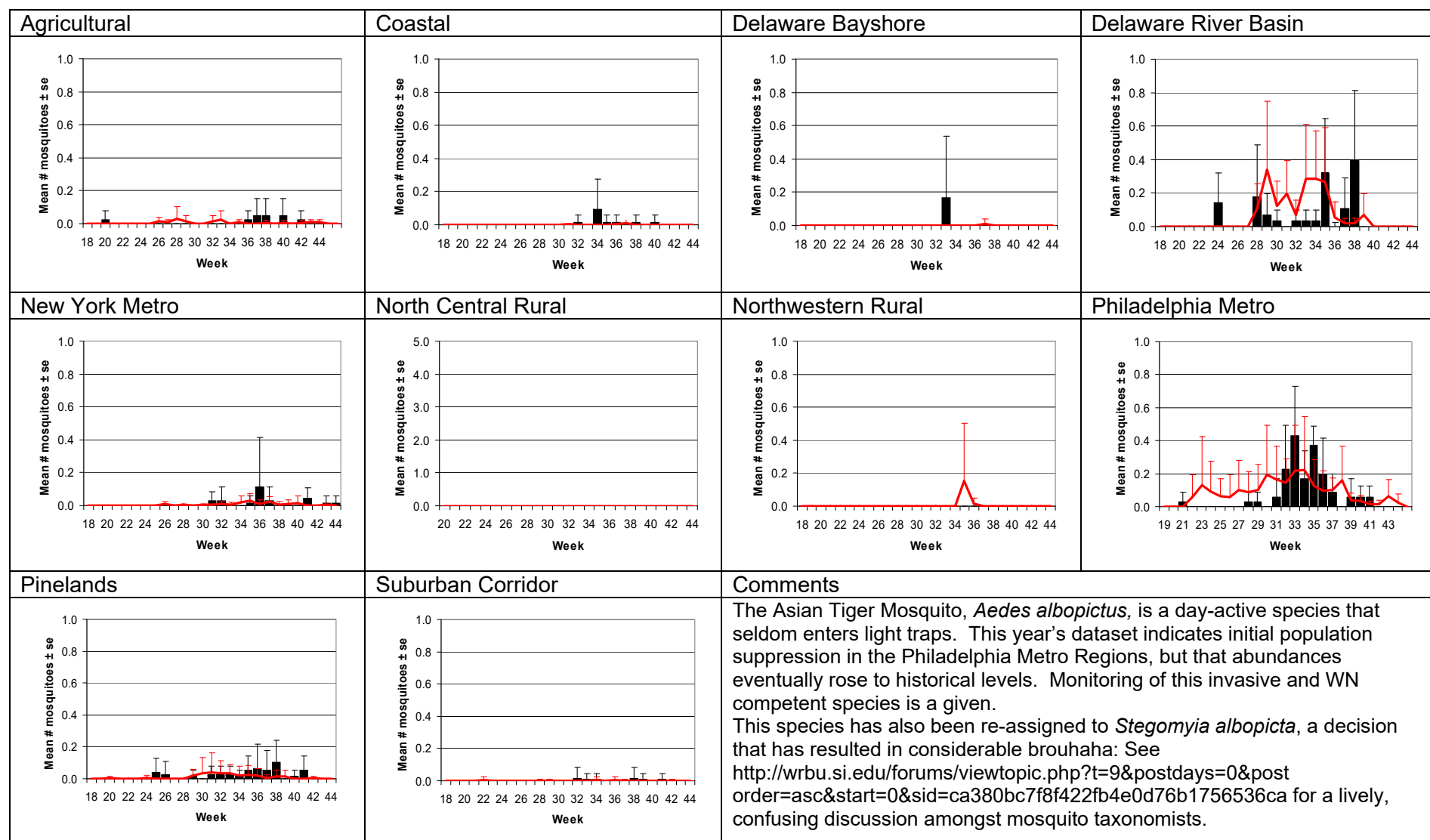
Ochlerotatus triseriatus – Multivoltine Aedine (*triseriatus*) Species



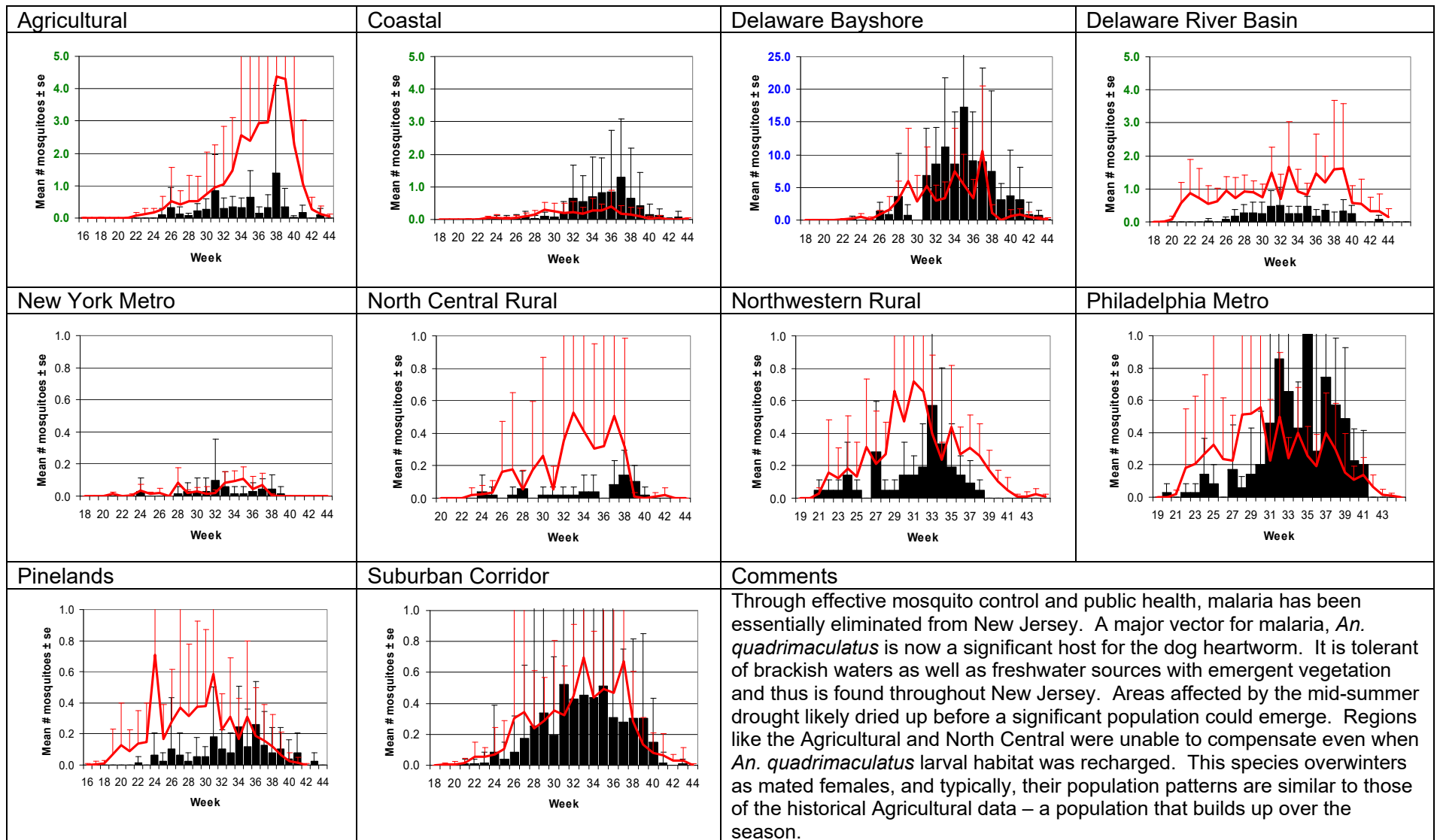
Ochlerotatus japonicus – Multivoltine Aedine



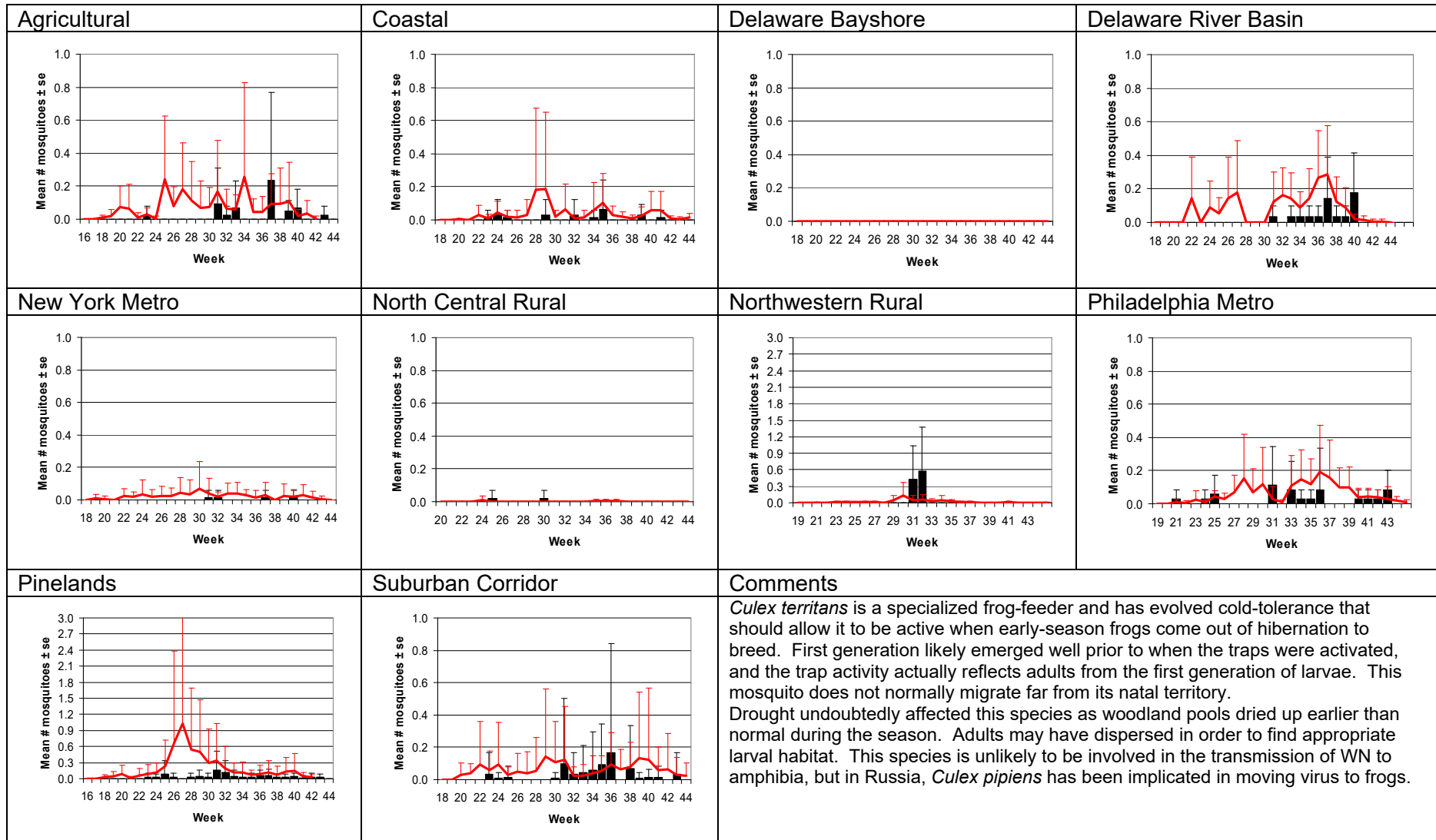
Aedes albopictus – Multivoltine Aedine (*triseriatus*) Species



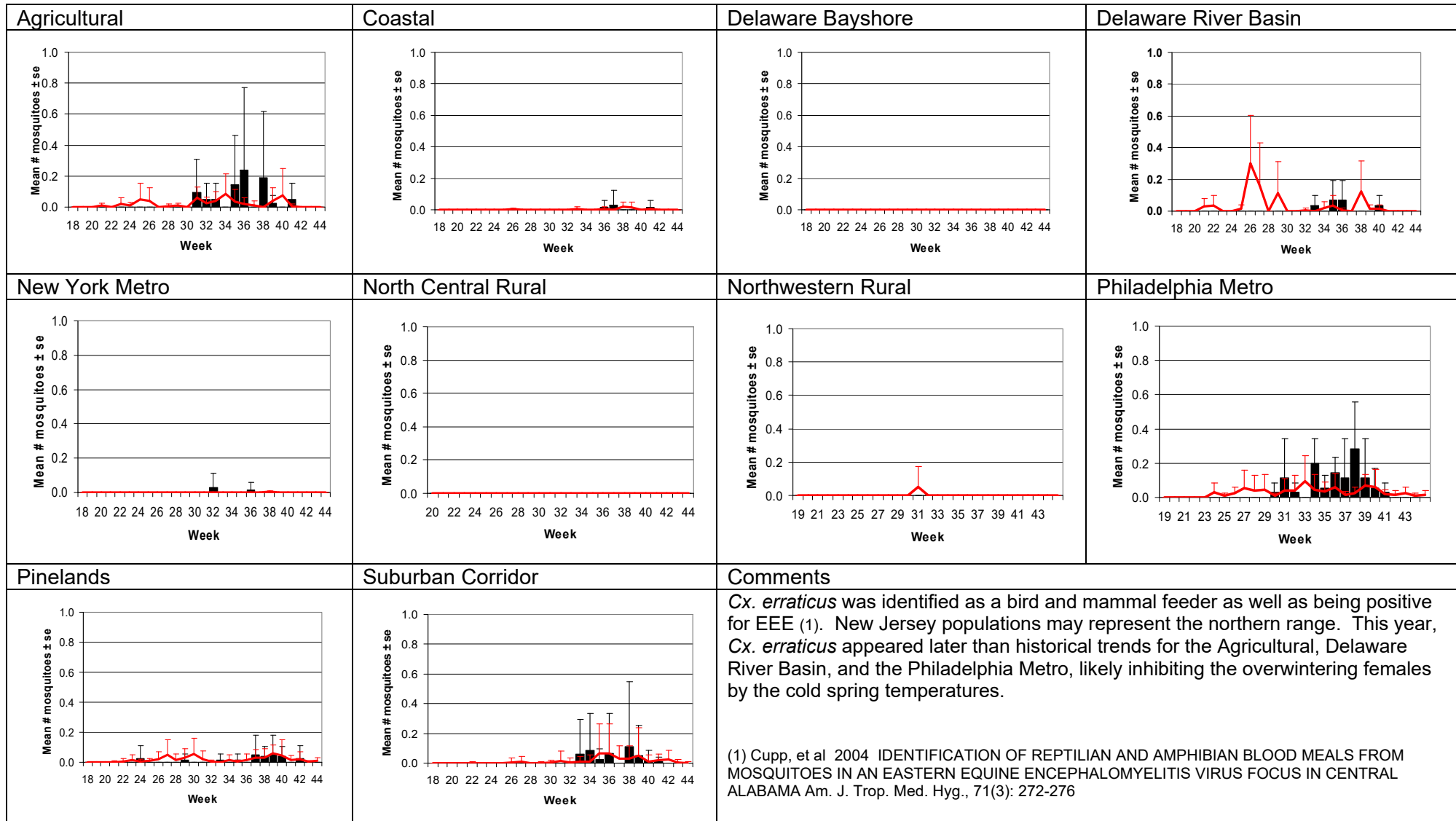
Anopheles quadrimaculatus – Multivoltine *Culex/Anopheles* (quadrimaculatus) Species



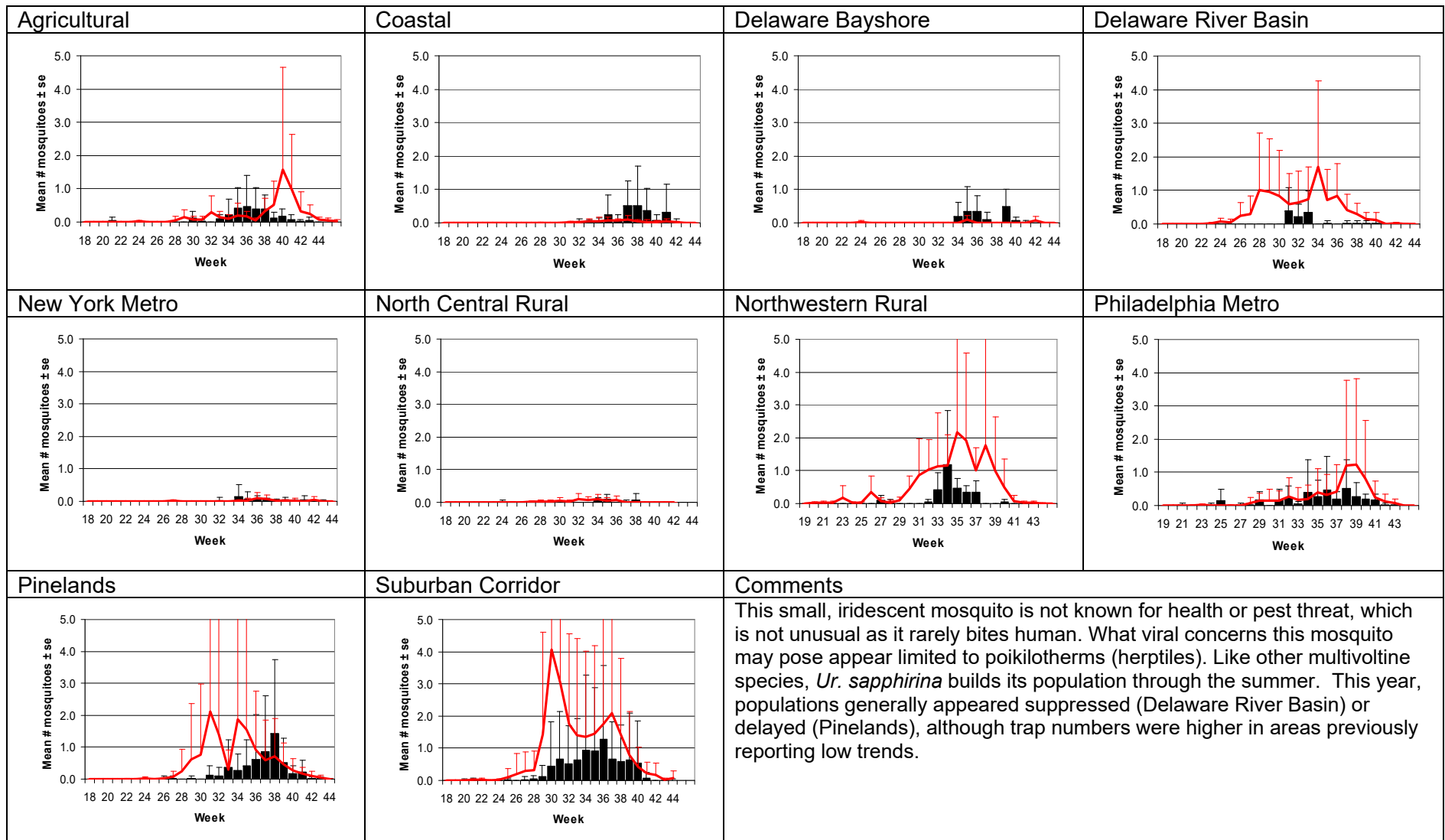
Culex territans – Multivoltine *Culex* Species



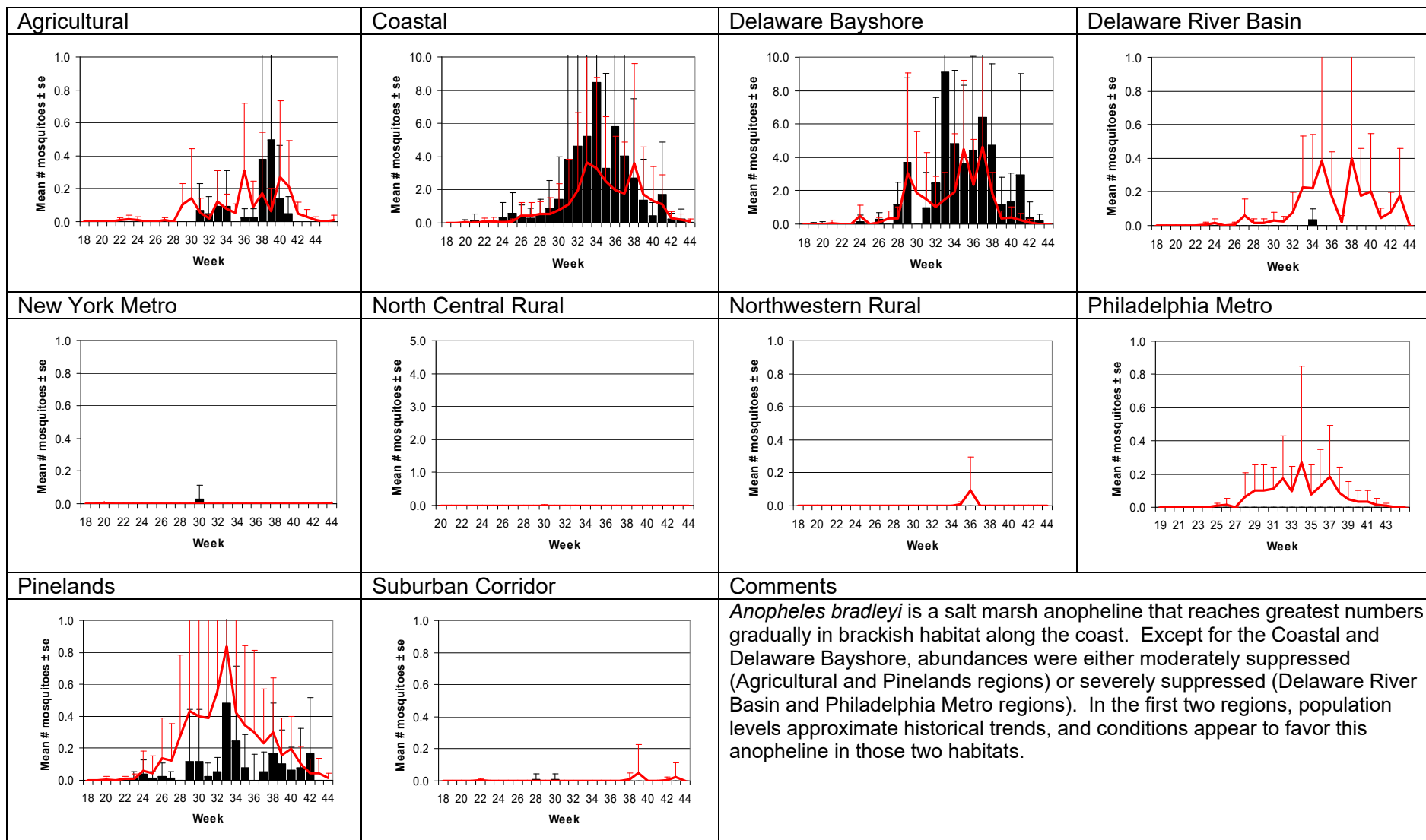
Culex erraticus – Multivoltine *Culex* Species



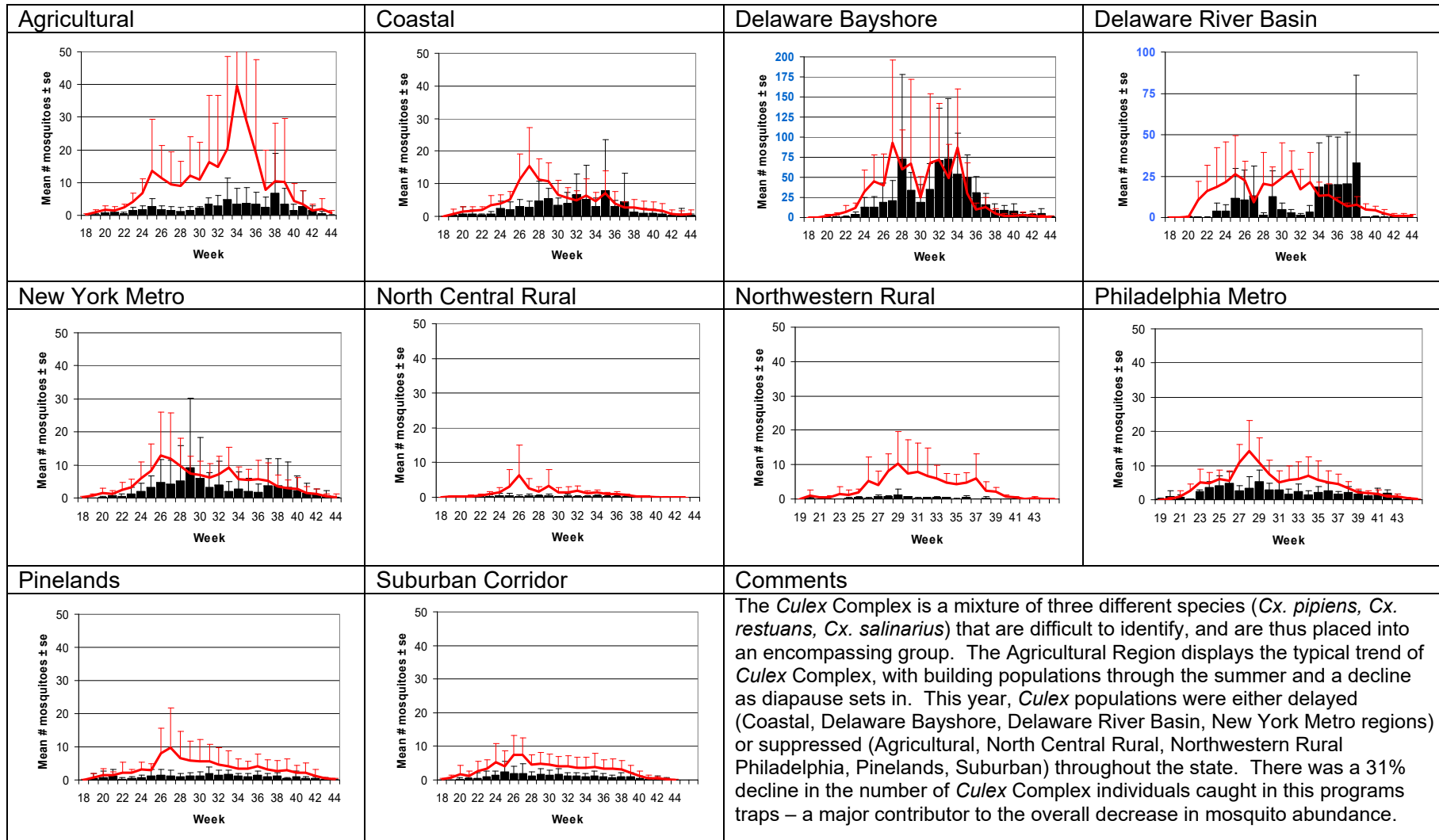
Uranotaenia sapphirina – Miscellaneous Group



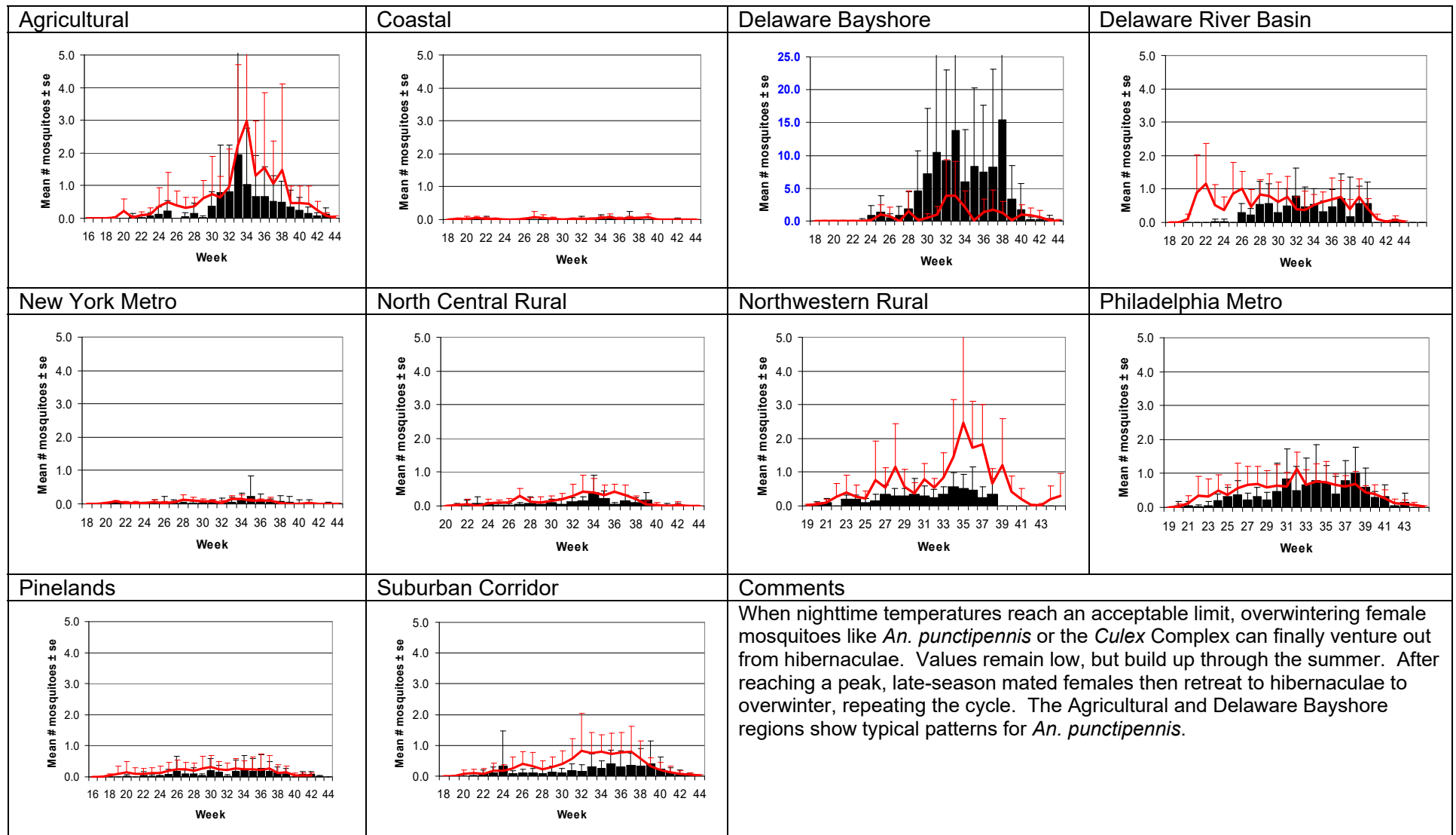
Anopheles bradleyi – Multivoltine *Culex/Anopheles (salinarius)* Species



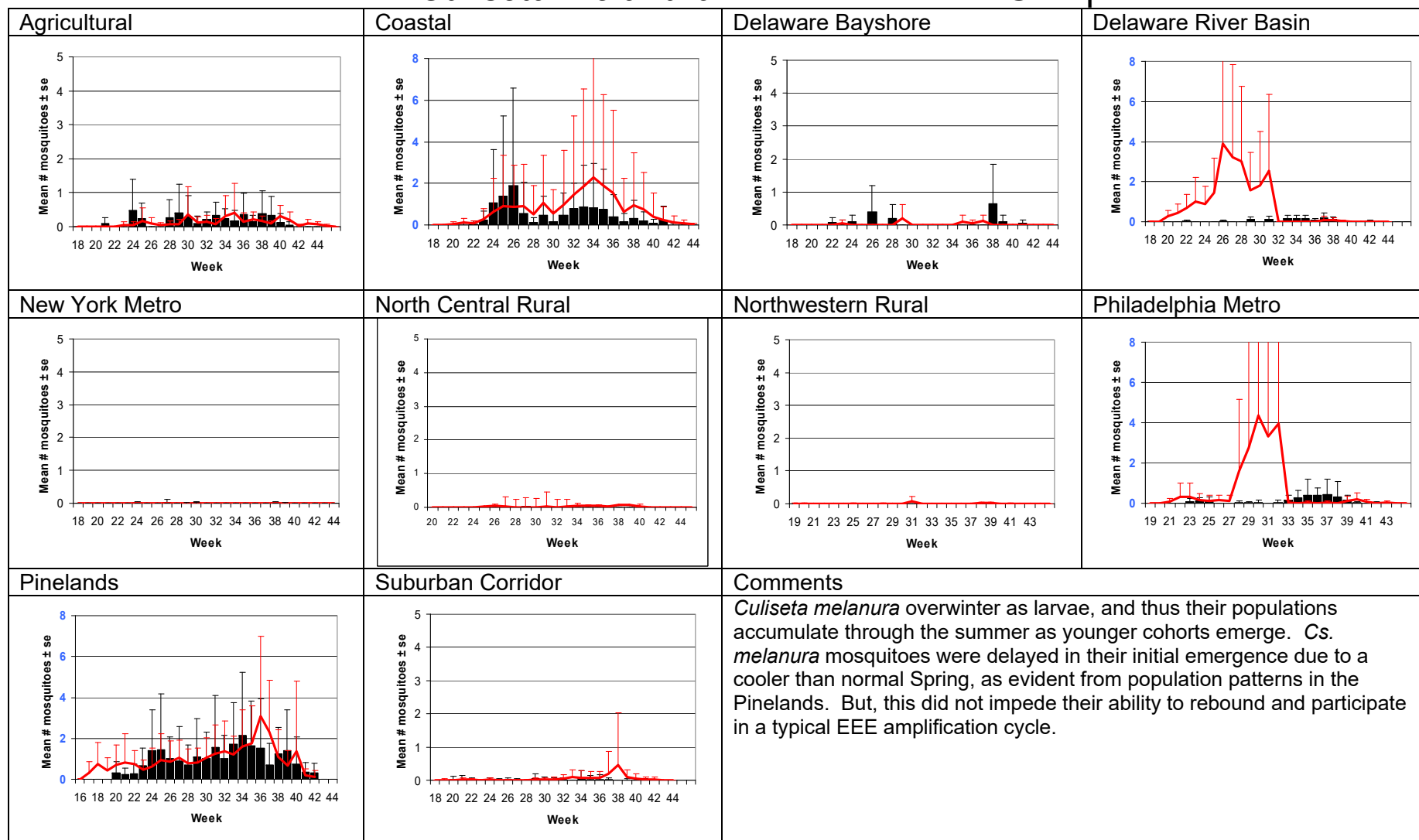
Culex Complex - Multivoltine Culex Species



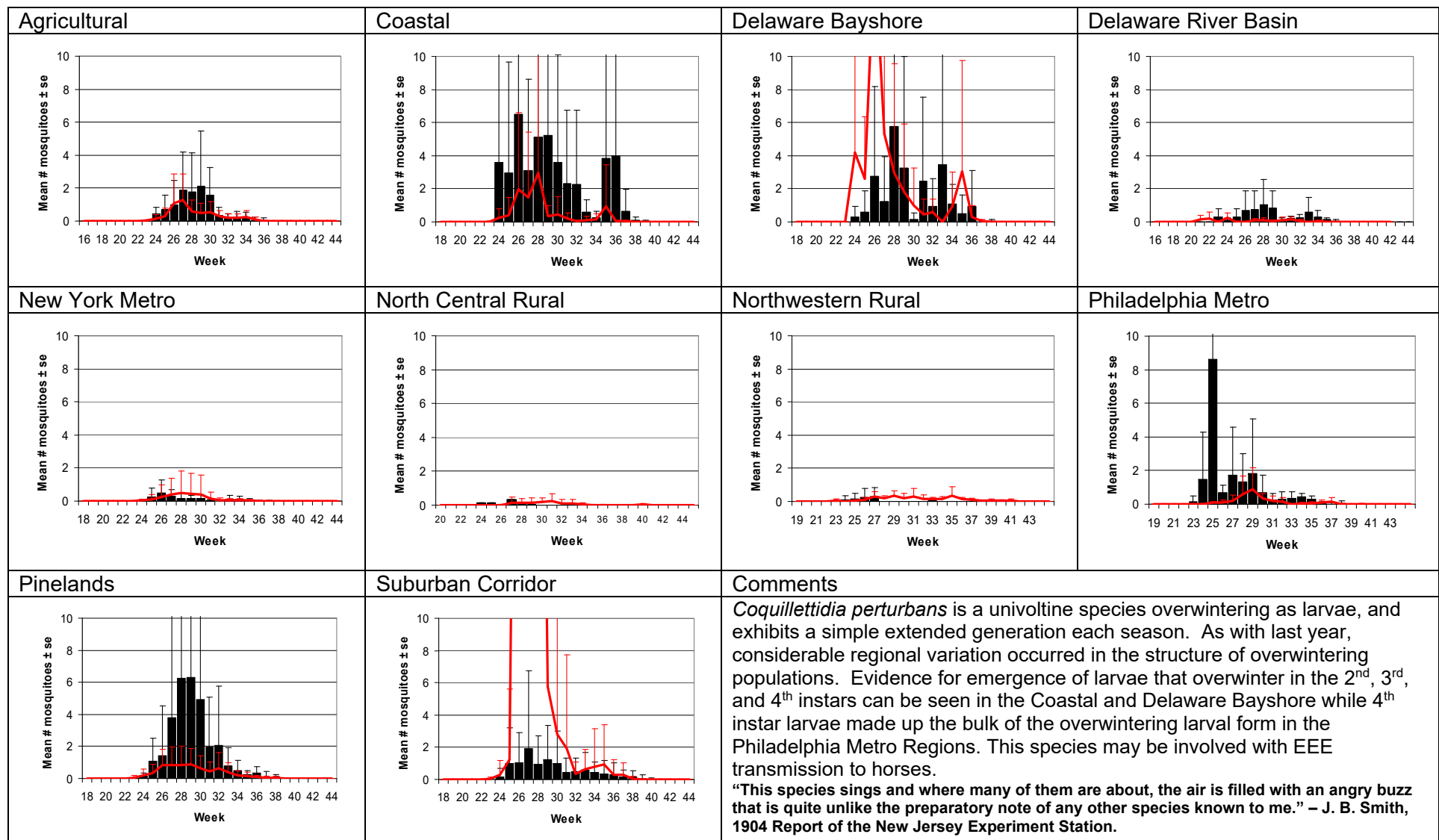
Anopheles punctipennis – Multivoltine Culex/Anopheles (pipiens) Species



Culiseta melanura – Miscellaneous Group



Coquilleltidia perturbans – Monotypic (*perturbans*) Species



Anopheles walkeri – Monotypic (*walkeri*) Species

