



NEW JERSEY STATE MOSQUITO CONTROL COMMISSION



A STATE MOSQUITO SURVEILLANCE PROGRAM FOR NEW JERSEY

FINAL WEEKLY REPORT FOR 2009 – SPECIES SUMMARIES

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NEW JERSEY STATE SURVEILLANCE

Final Weekly Report for 2009

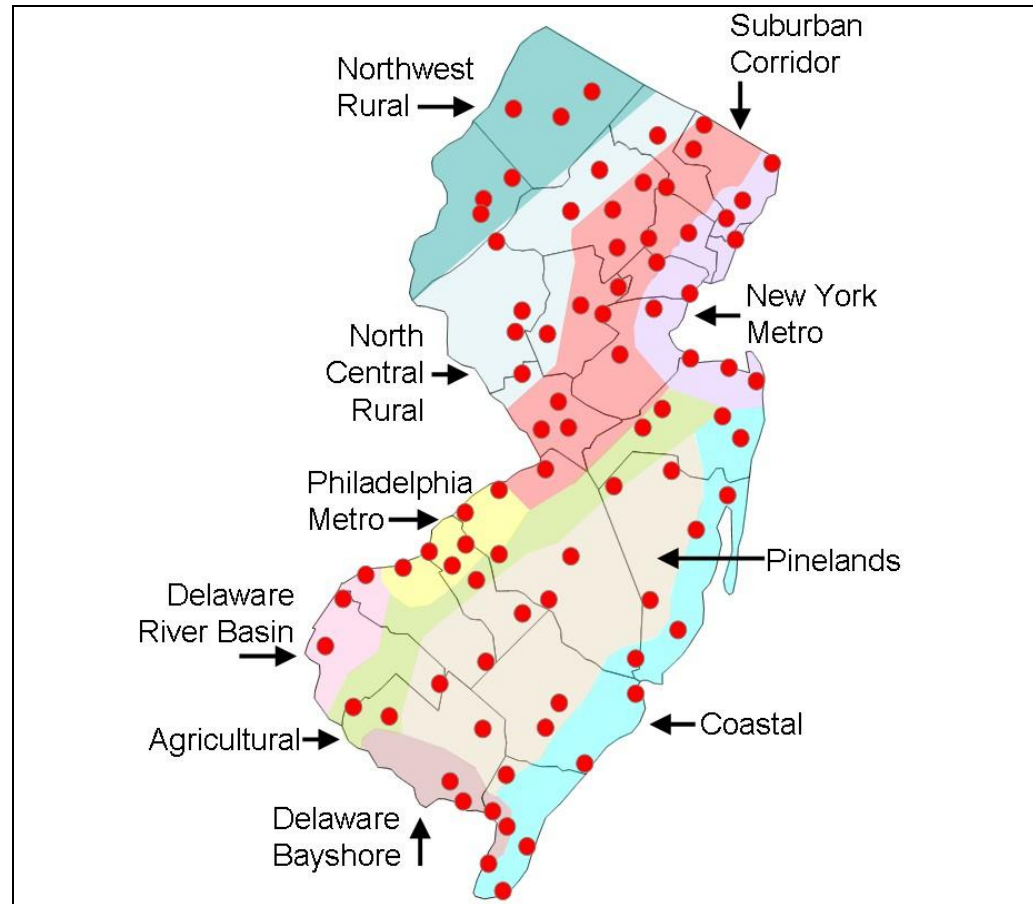
Purpose: Data from 84 New Jersey light traps contributed by county mosquito control agencies are used to calculate trends in mosquito populations for species of nuisance or health concerns.

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 2009 Season: Nineteen of the 21 county mosquito control agencies participated in this program during the season. 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 week's report than during the current week. Care must be taken with the interpretation of the most current week's data.



During 2009, 36 mosquito species were identified out of the 237,436 individual mosquitoes caught in the statewide surveillance light trap network throughout New Jersey. This number appears to be within the range from recent years (between 100,000 and 300,000 individuals). No *Anopheles earlei* were trapped, and those species with less than 10 individuals trapped for the entire season includes *Aedes abserratus*, *Ae. atropalpus*, *Ae. barberi*, and *Psorophora howardii*.

The Coastal and Pinelands collected a wider variety of mosquitoes than did other regions. This is different than several times in the past where the Suburban Corridor instead of the Pinelands collected more species. Also, the number of traps set in each region was significantly correlated with the number of species found (Table 1. Pearson's $r=0.671$, $n=10$, $p < 0.02$) but the correlation was not "tight" so that the suburban corridor, with the most number of traps actually caught fewer species this year. It was, however, the region with the largest number of individuals trapped (at 43,280) yet the number of traps used did not correlate with the number of mosquitoes caught (Pearson's $r=0.55$, $p>0.05$). The second most abundant numbers caught was in the Northwestern Rural region, with only 7 traps.

Table 1. Number of county traps used in each region with the number of mosquito species identified in the traps.

Region	Number of Traps	Number of Species	Number of Mosquitoes
Agricultural	6	26	7,134
Coastal	9	30	39,902
Delaware Bayshore	6	23	35,626
Delaware River Basin	2	15	6,538
New York Metro	10	25	26,493
North Central Rural	8	20	4,281
Northwestern Rural	7	22	40,294
Philadelphia Metro	6	22	13,743
Pinelands	11	29	20,145
Suburban	17	27	43,280
Statewide Total	82	36	237,436

The most abundant species caught statewide were the *Culex* Mixed (including *Cx. pipiens*, *Cx. salinarius* and *Cx. restuans*), *Aedes vexans*, *Ae. sollicitans* and *Ae. cantator* (Figure 1). In half of the 10 regions, the Mixed *Culex* populations were in greatest number. In the other half of the regions, *Ae. vexans* was the predominant species. *Ae. sollicitans* is a significant pest in 5 of the regions. In some previous years, this species has been outnumbered by *Ae. cantator* or *An. bradleyi* in regions that *Ae. sollicitans* has dominated.

A calibration class in the spring prior to the 2009 mosquito season was offered to any county that wished to learn about the proper maintenance and calibration of light traps of which several counties attended. Cleaned and calibrated traps confer compatibility of the datasets.

Figure 1. Cumulative totals for light trap species statewide and Top Ten for each region, 2009.

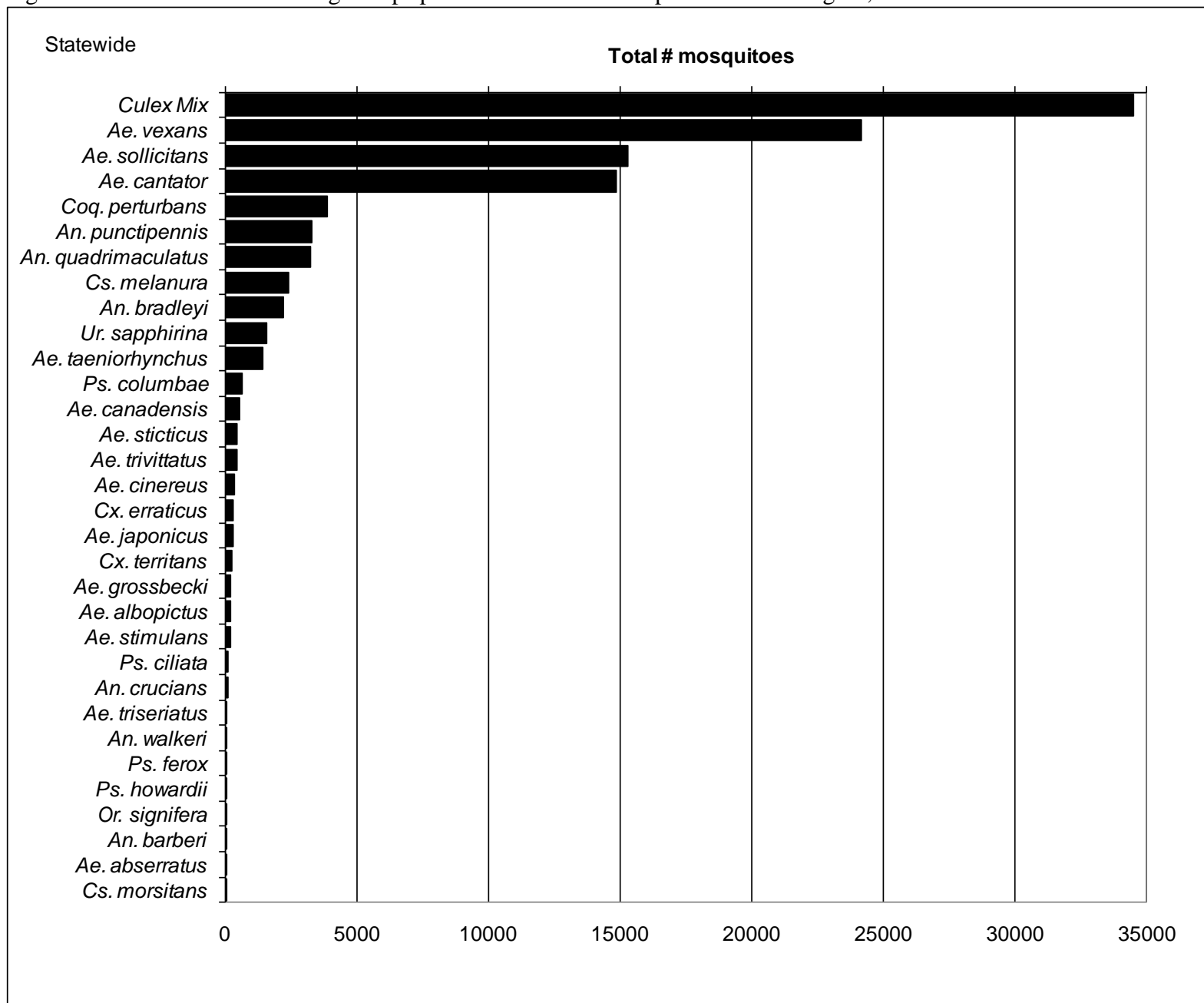


Figure 2. Agricultural Region.

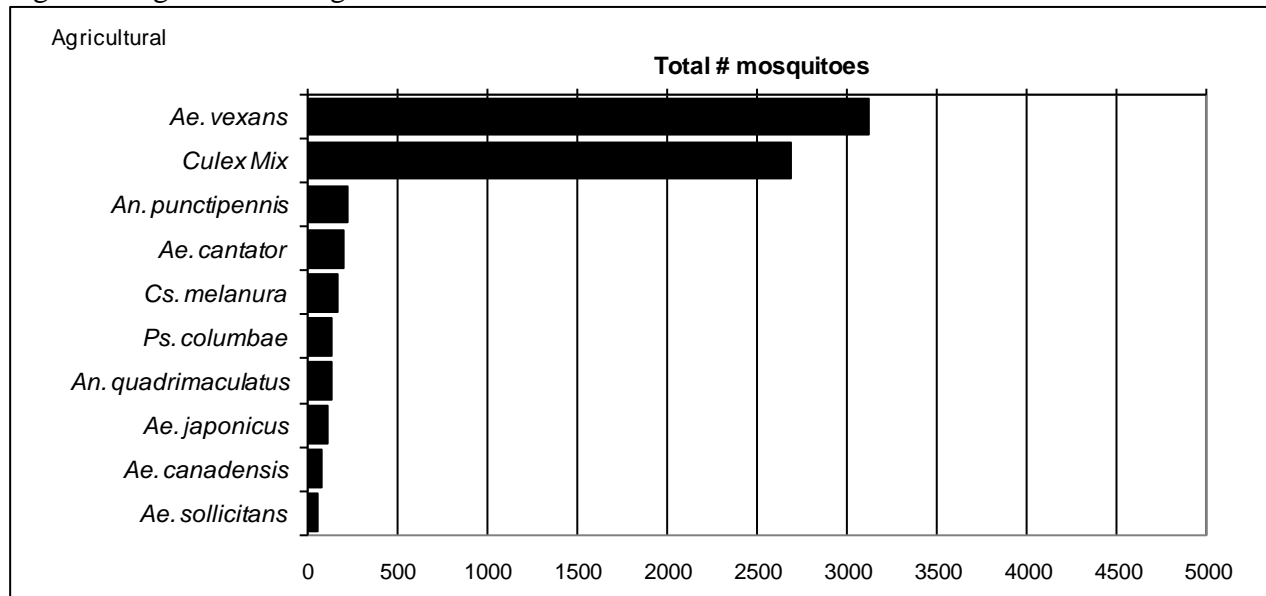


Figure 3. Coastal Region.

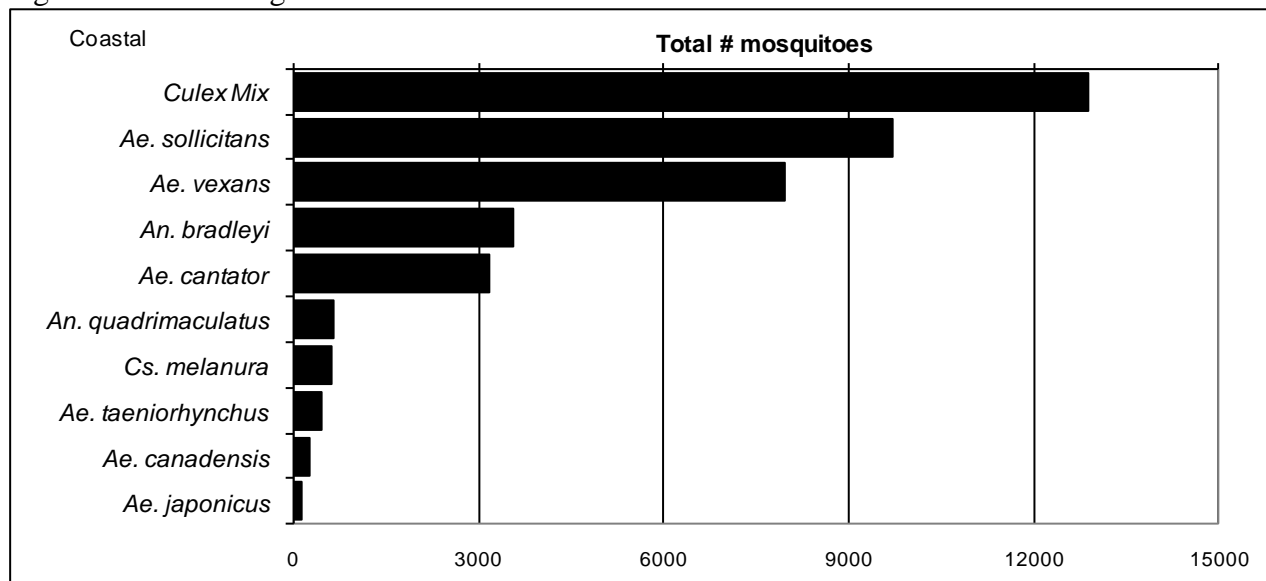


Figure 4. Delaware Bayshore Region.

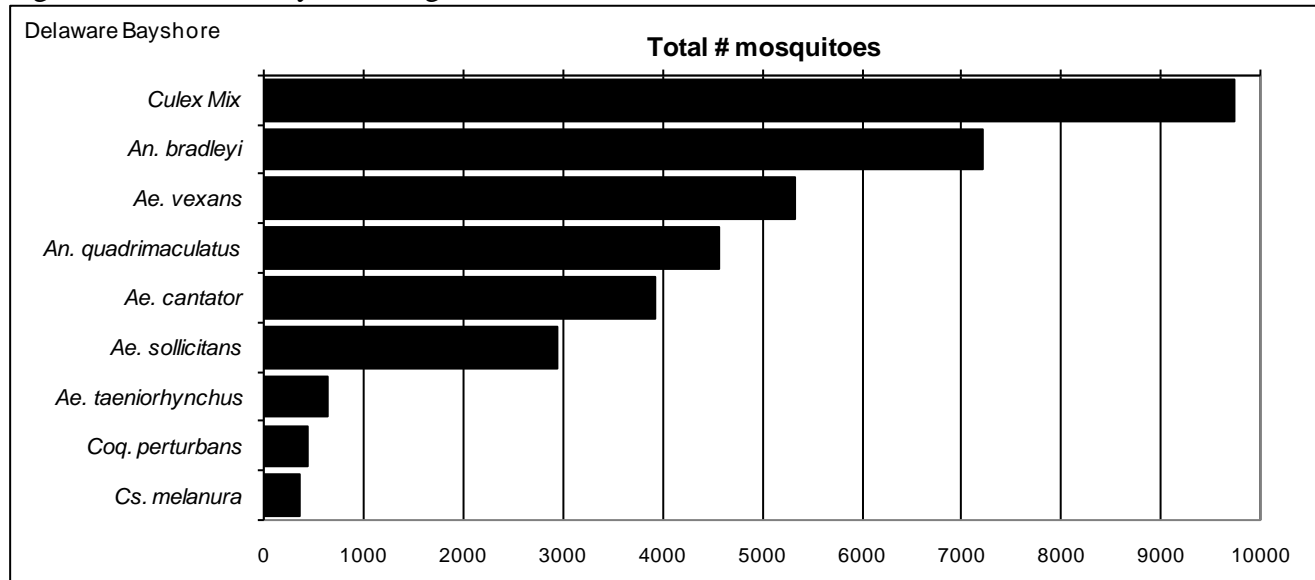


Figure 5. Delaware River Basin Region.

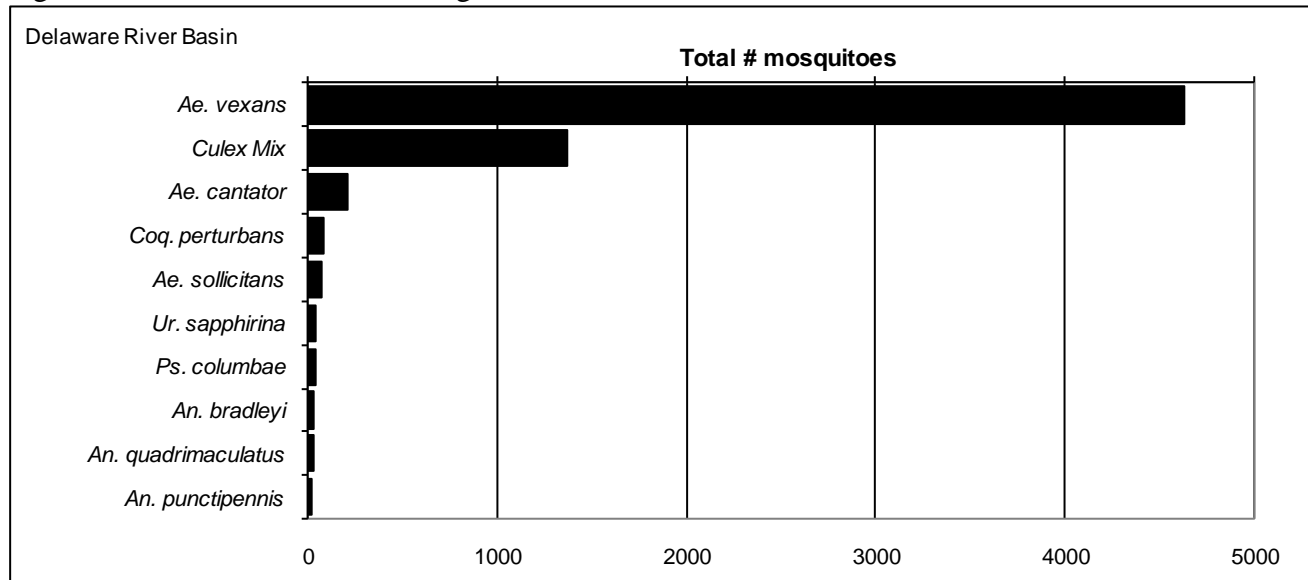


Figure 6. New York Metropolitan Region.

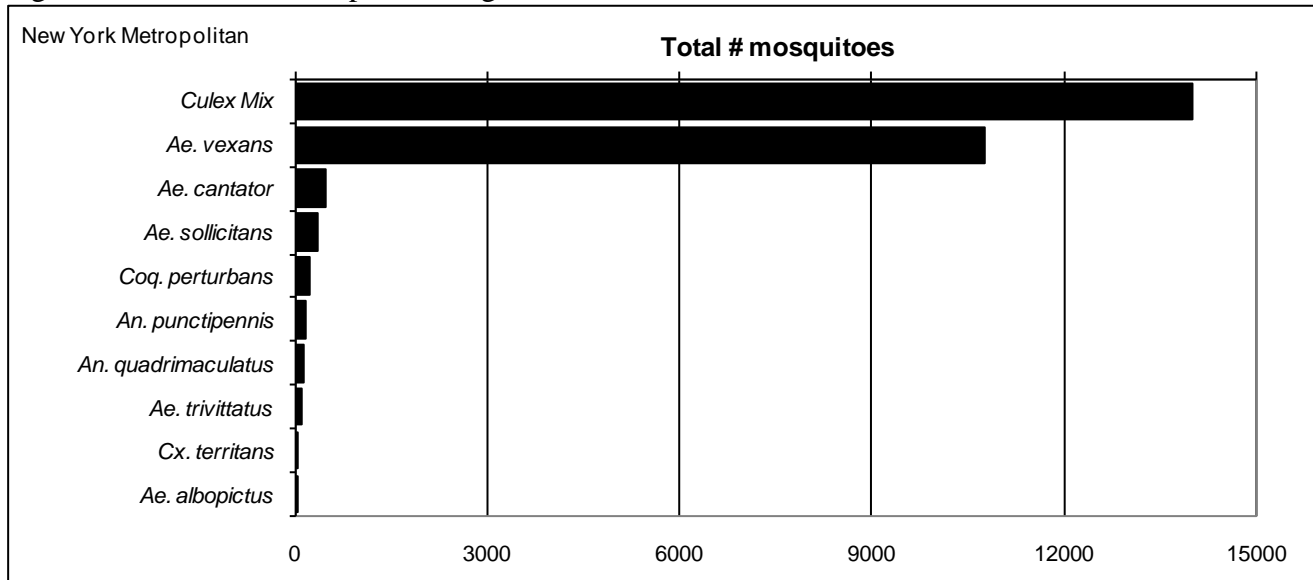


Figure 7. North Central Region.

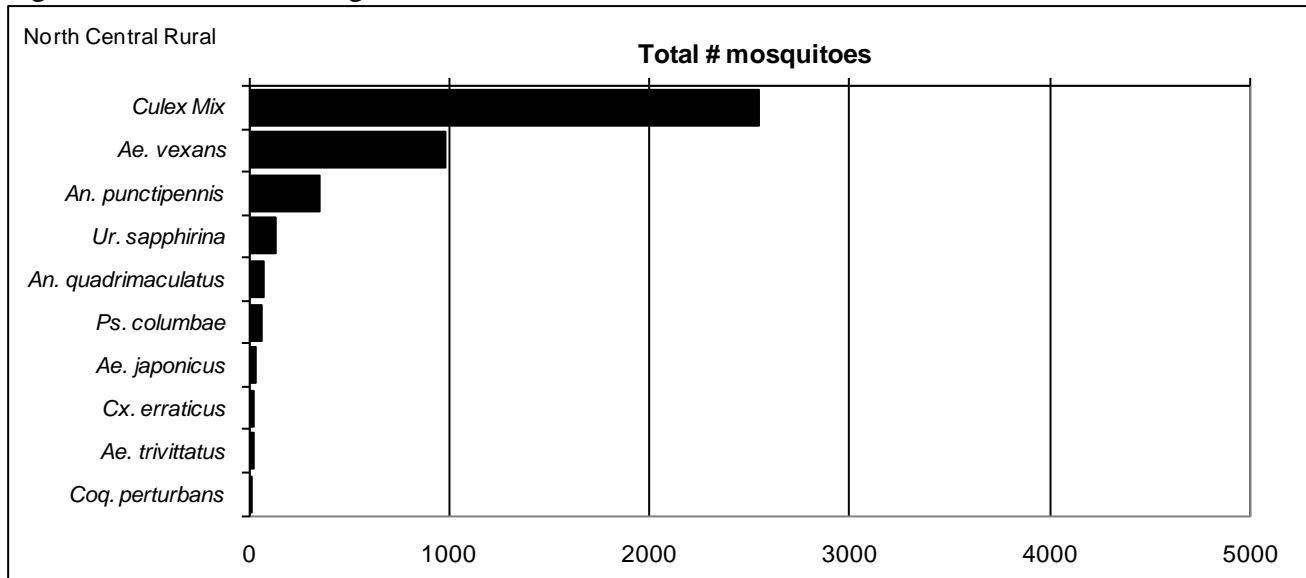


Figure 8. Northwestern Rural Region.

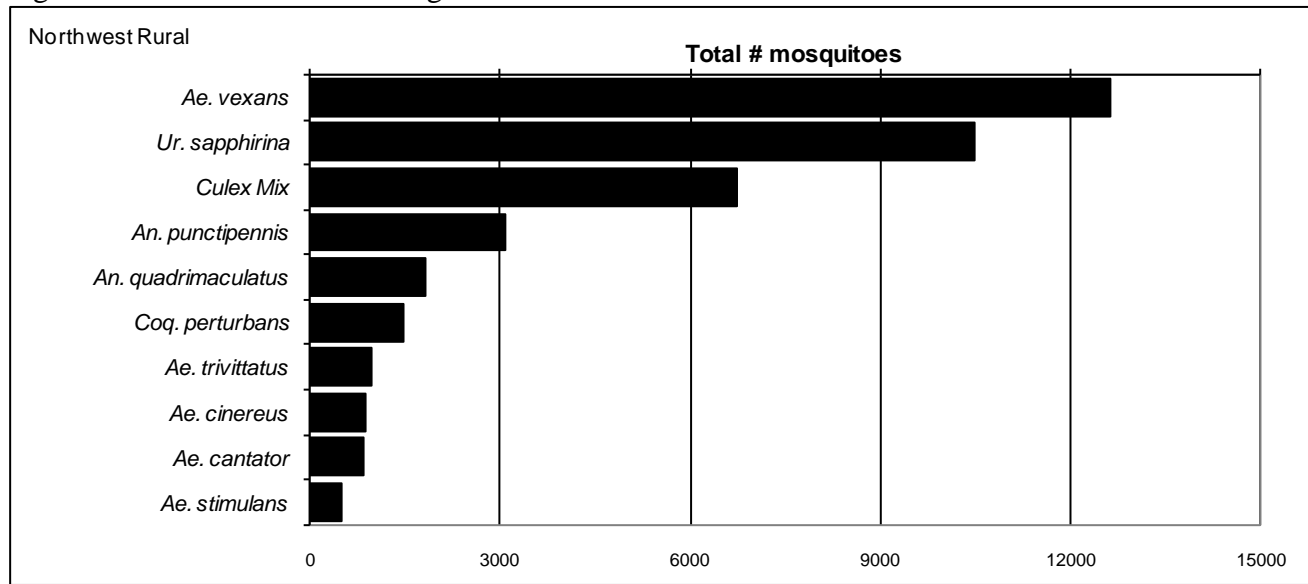


Figure 9. Philadelphia Metropolitan Region.

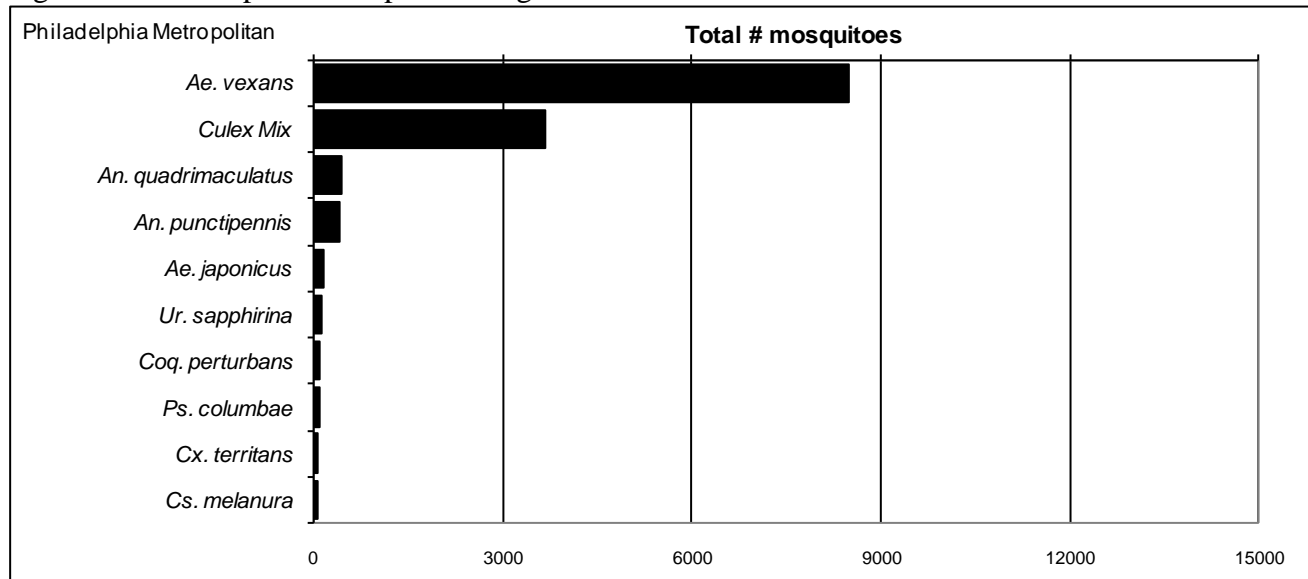


Figure 10. Pinelands Region.

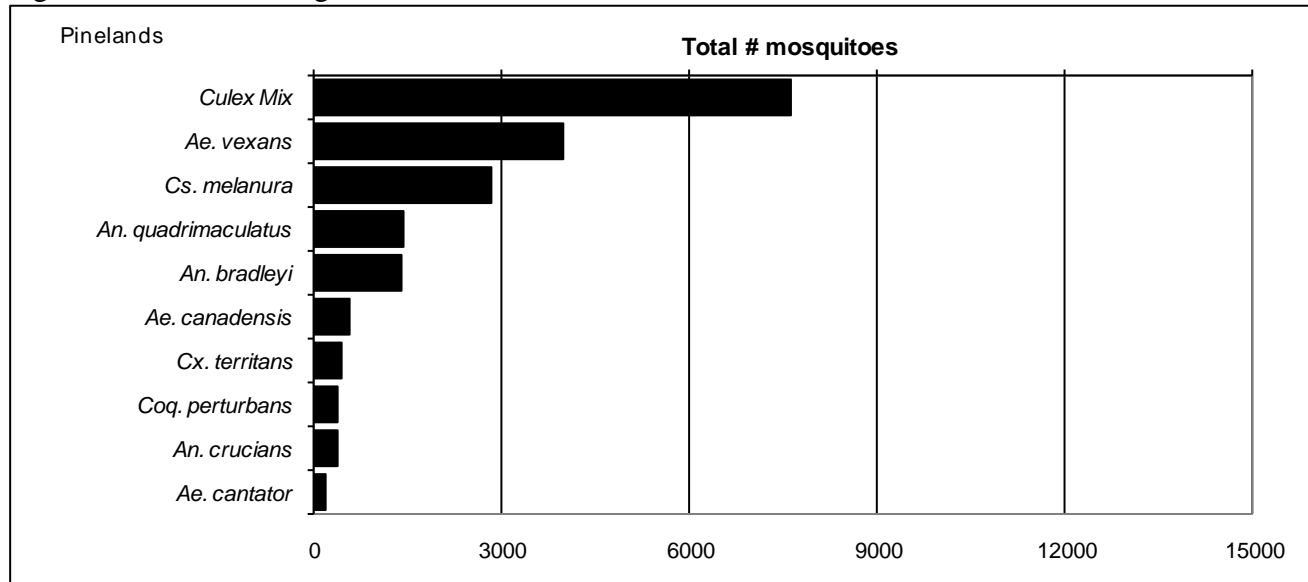
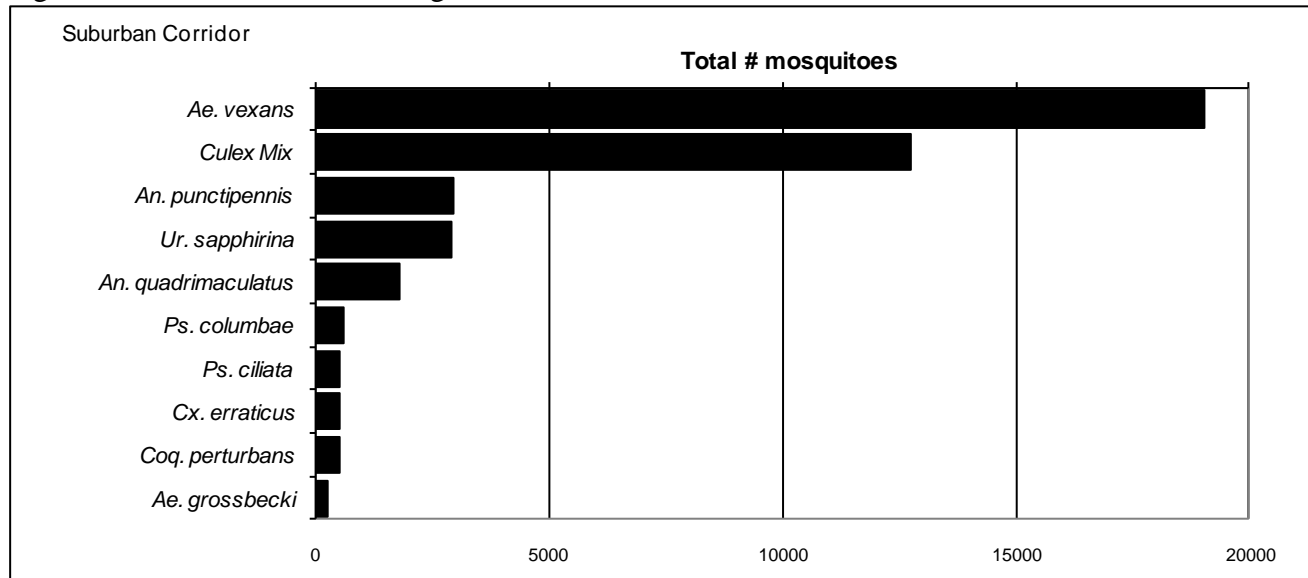


Figure 11. Suburban Corridor Region.



Figures 12-38: Species Summaries. 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 27 species from 2009 in the life cycle types below. Historical data was entered for all regions as a running mean encompassing the previous five years. For some regions, historical data is based on fewer than 5 traps. By next year, most of the historical data will be based on the running mean of 5 years 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 2009 dataset.

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. grossbecki*, *Ae. canadensis*, *Ae. cinereus* & *Ae. sticticus*. (Figures 12-16).

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. columbiae*, *Ps. ciliata* & *Ps. ferox*, (Figures 17-21).

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* & *Ae. teaniorhynchus*. (Figures 22-24).

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* & *Ae. albopictus*. (Figures 25-27).

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*, *Uranotaenia sapphirina*, *Cx. erraticus* & *Cx. territans*. (Figures 28-31).

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*. (Figure 32).

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* (Figures 33-34).

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: *Cs. melanura* & *An. crucians* (*Cs. melanura* type), *Cq. perturbans* (*Cq. perturbans* type), & *An. walkeri* (*An. walkeri* type). (Figures 35-38).

Figure 12.

Aedes stimulans – Univoltine *Aedine* (*Ae. stimulans* Type)

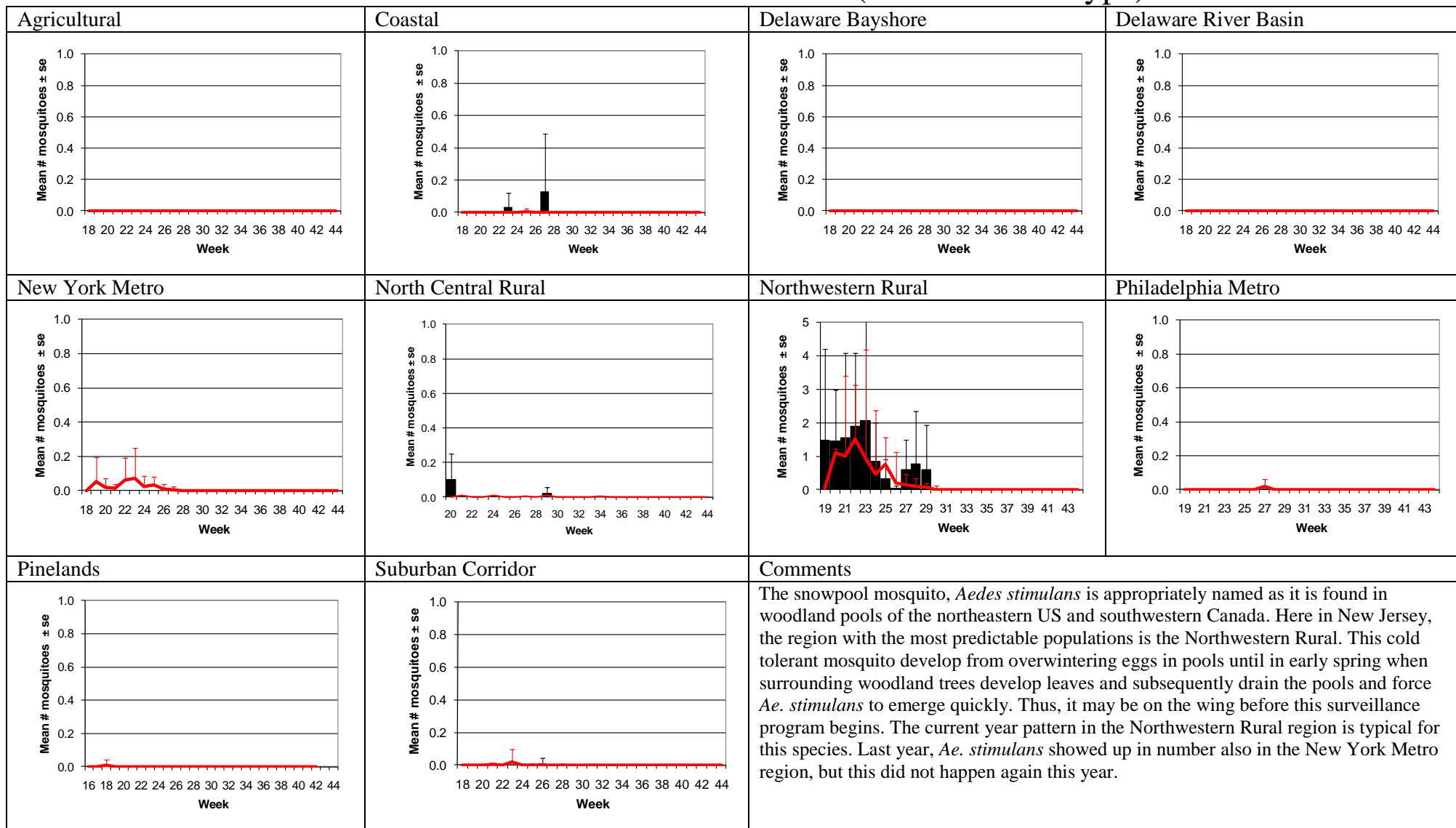


Figure 13.

Aedes grossbecki – Univoltine *Aedine* (*Ae. stimulans* Type)

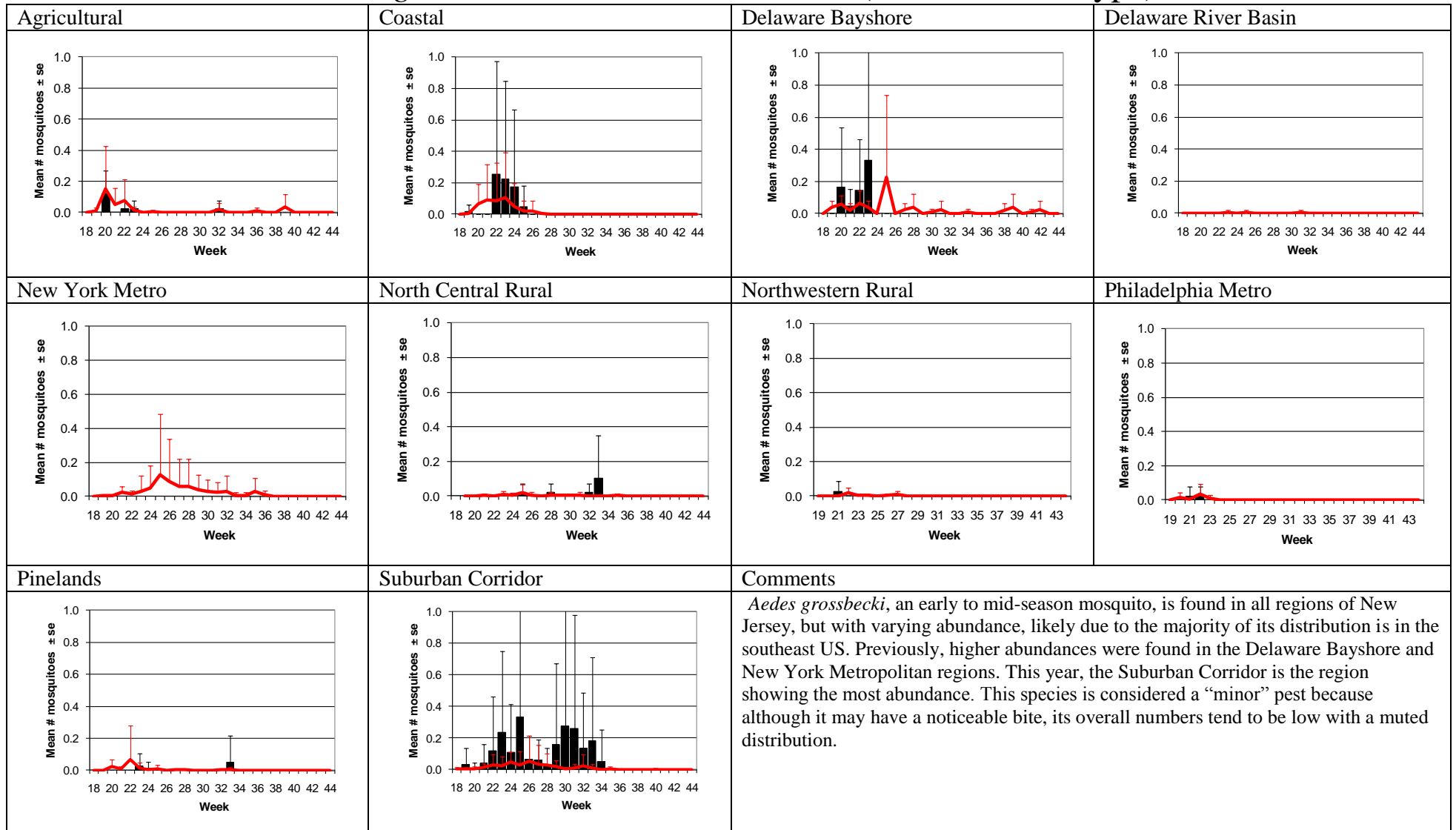


Figure 14.

Aedes canadensis – Univoltine Aedine (*Aedes canadensis* Type)

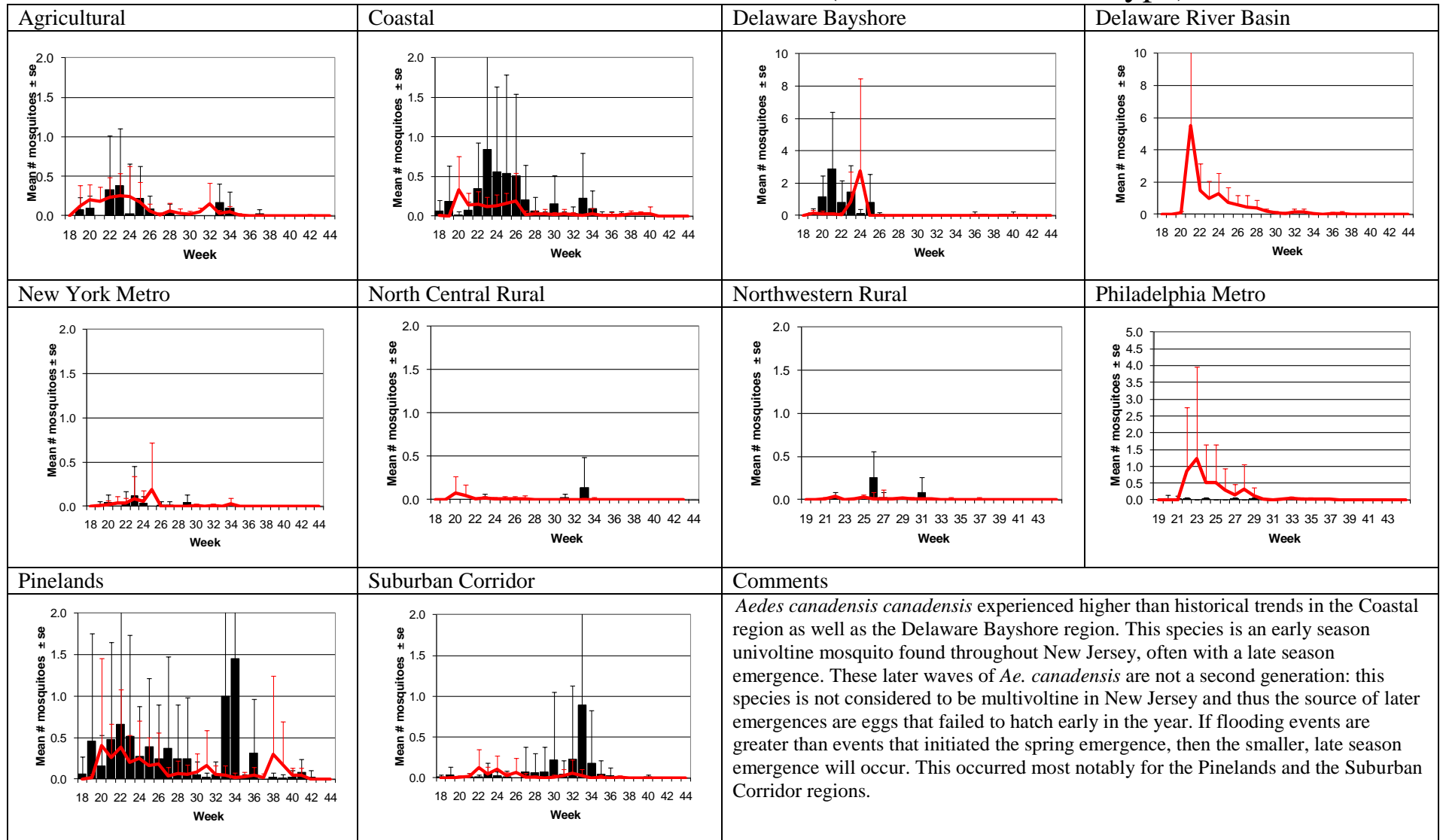


Figure 15.

Aedes cinereus – Univoltine Aedine (*Aedes canadensis* Type)

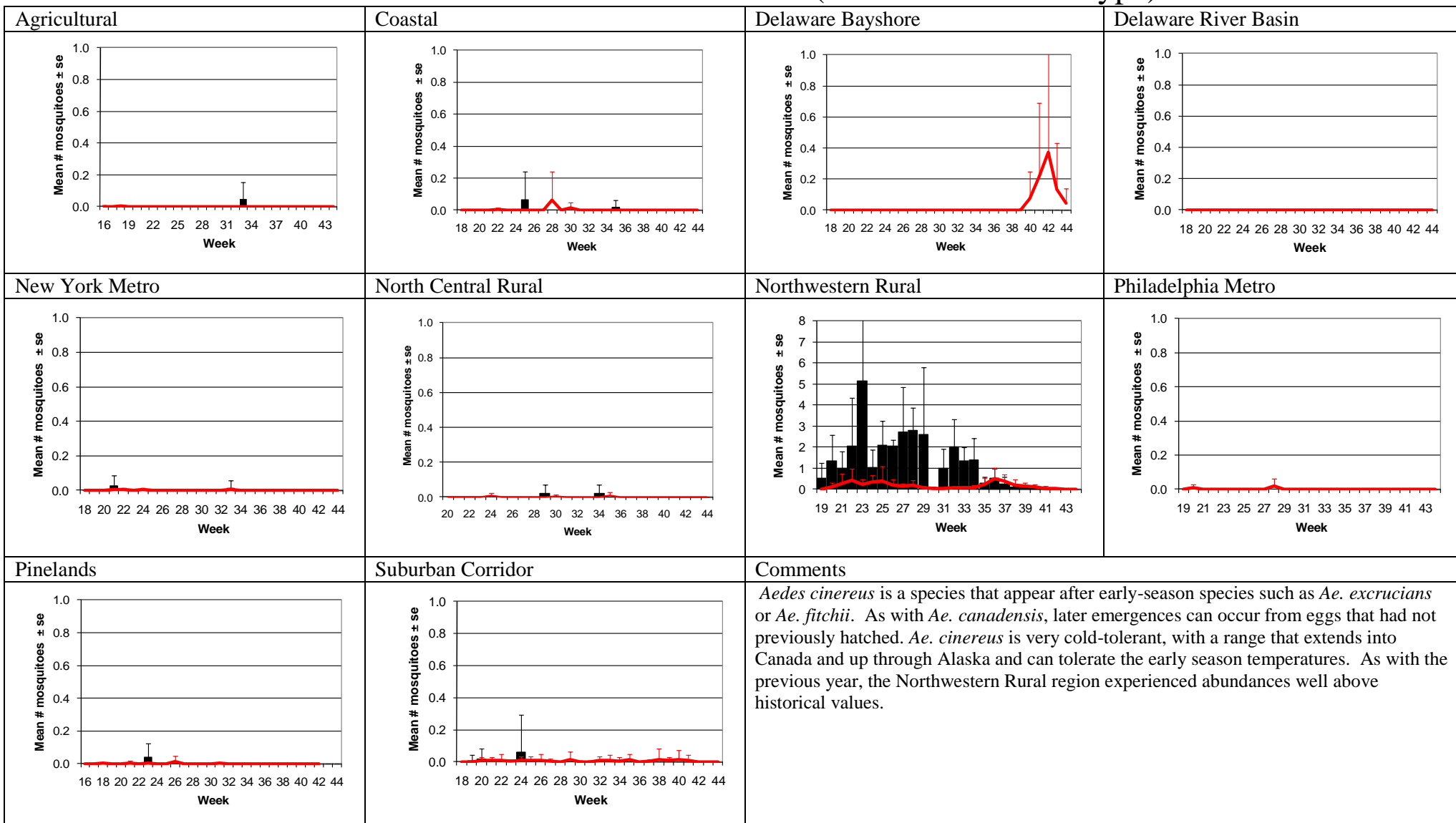


Figure 16.

Aedes sticticus – Univoltine Aedine (*Aedes canadensis* Type)

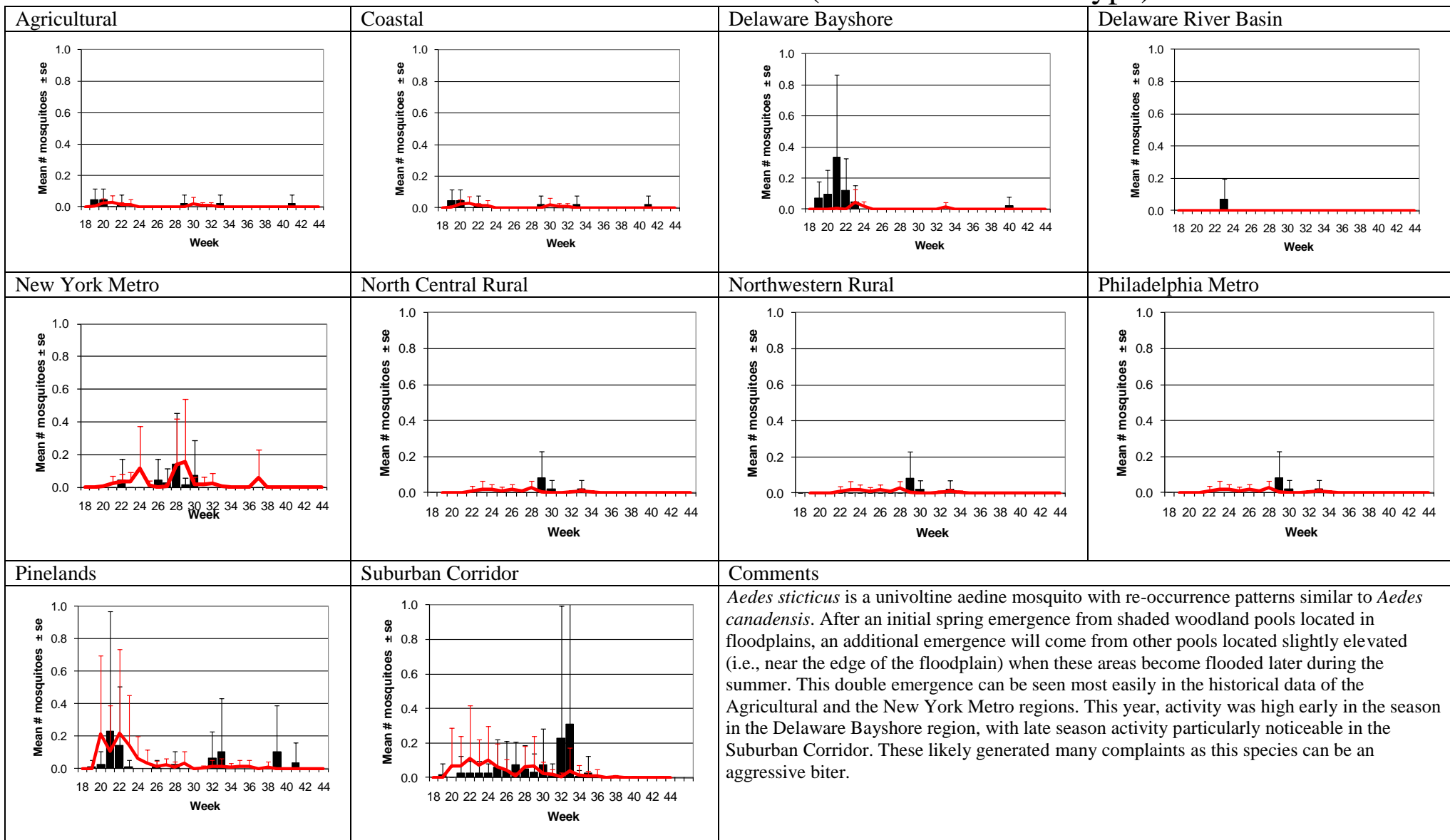


Figure 17.

Aedes vexans – Multivoltine *Aedine* (*Ae. vexans* Type)

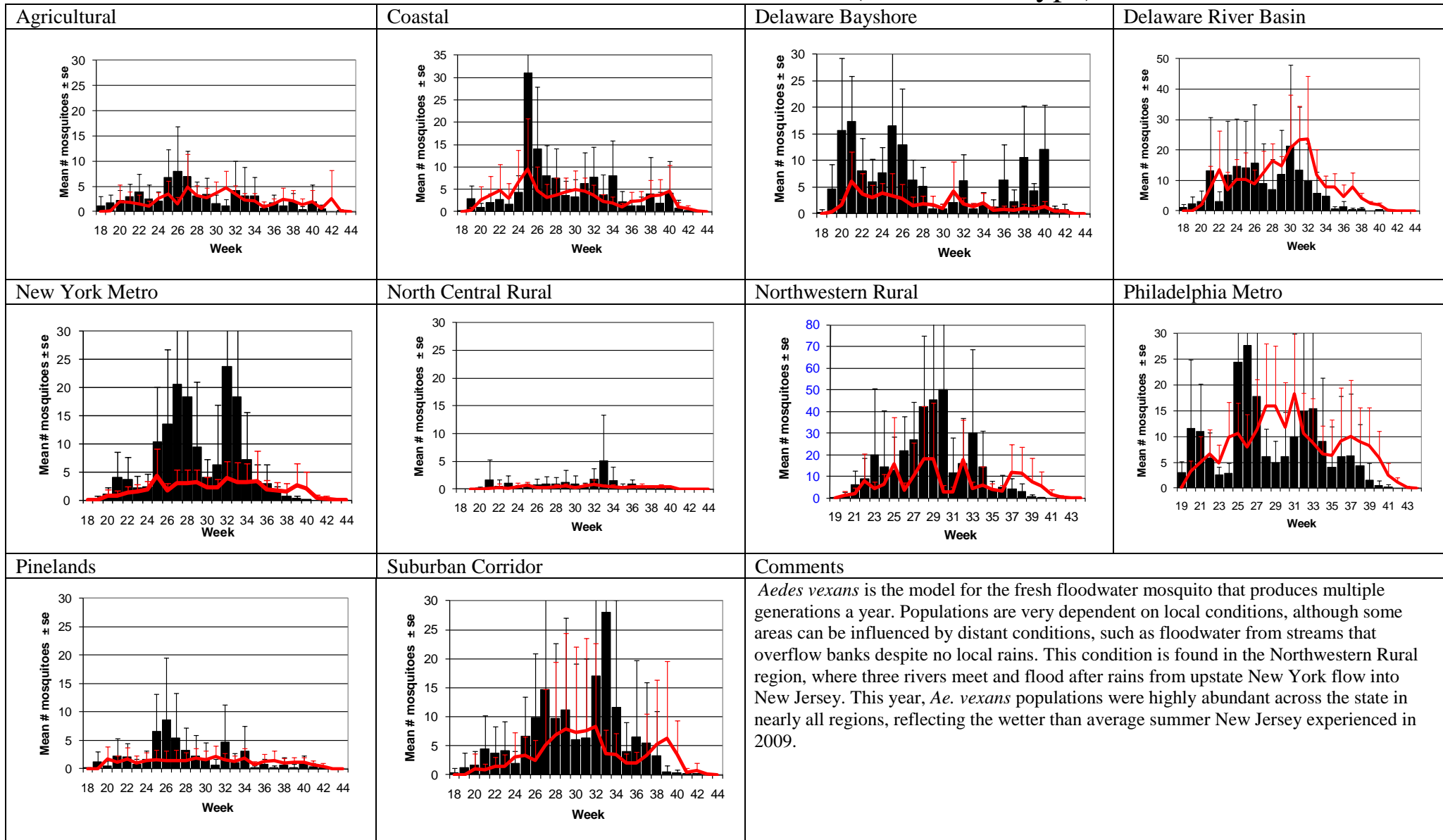


Figure 18.

Aedes trivittatus – Multivoltine Aedine (*Ae. vexans* Type)

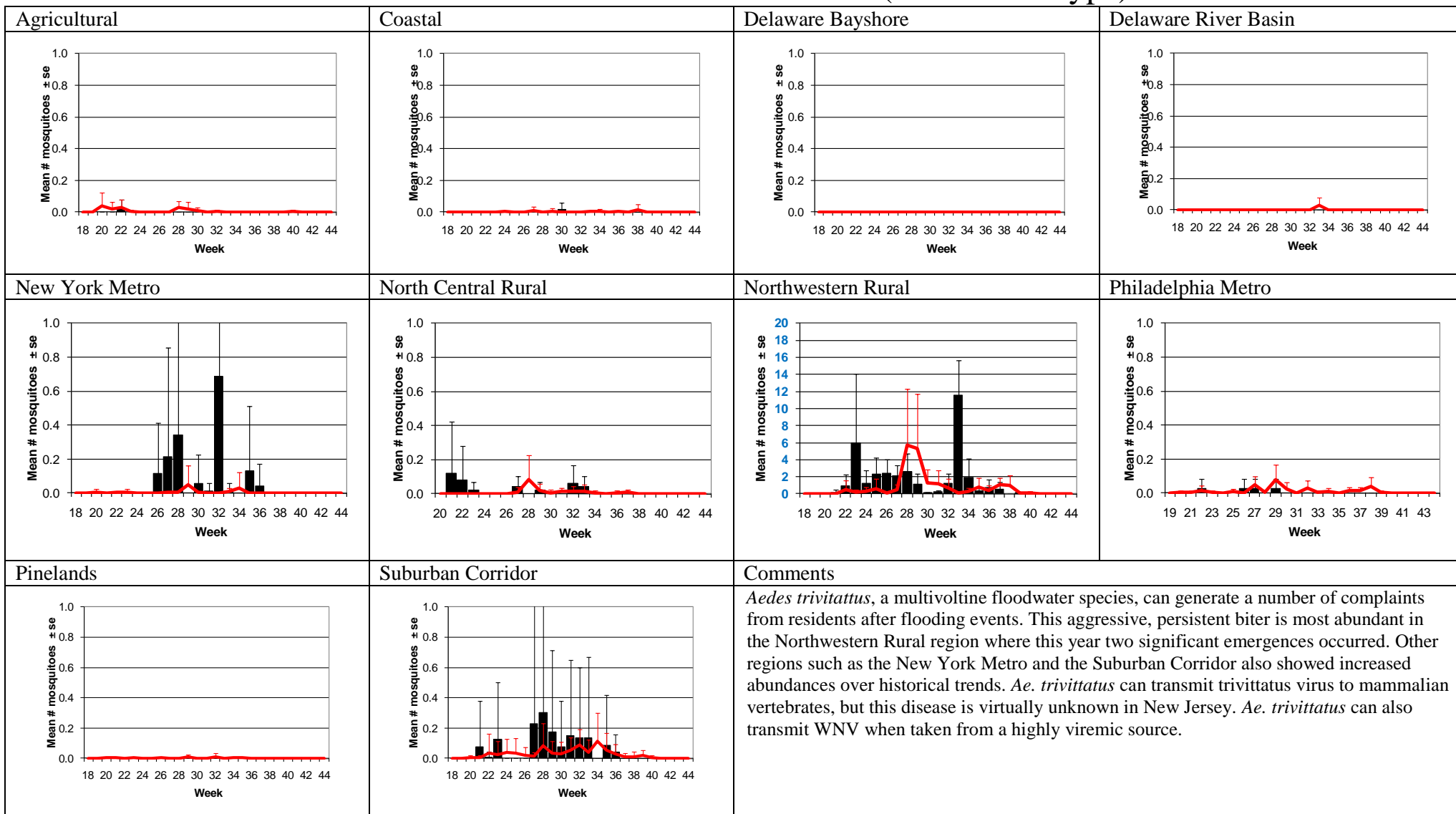


Figure 19.

Psorophora columbiae – Multivoltine Aedine (*Ae. vexans* Type)

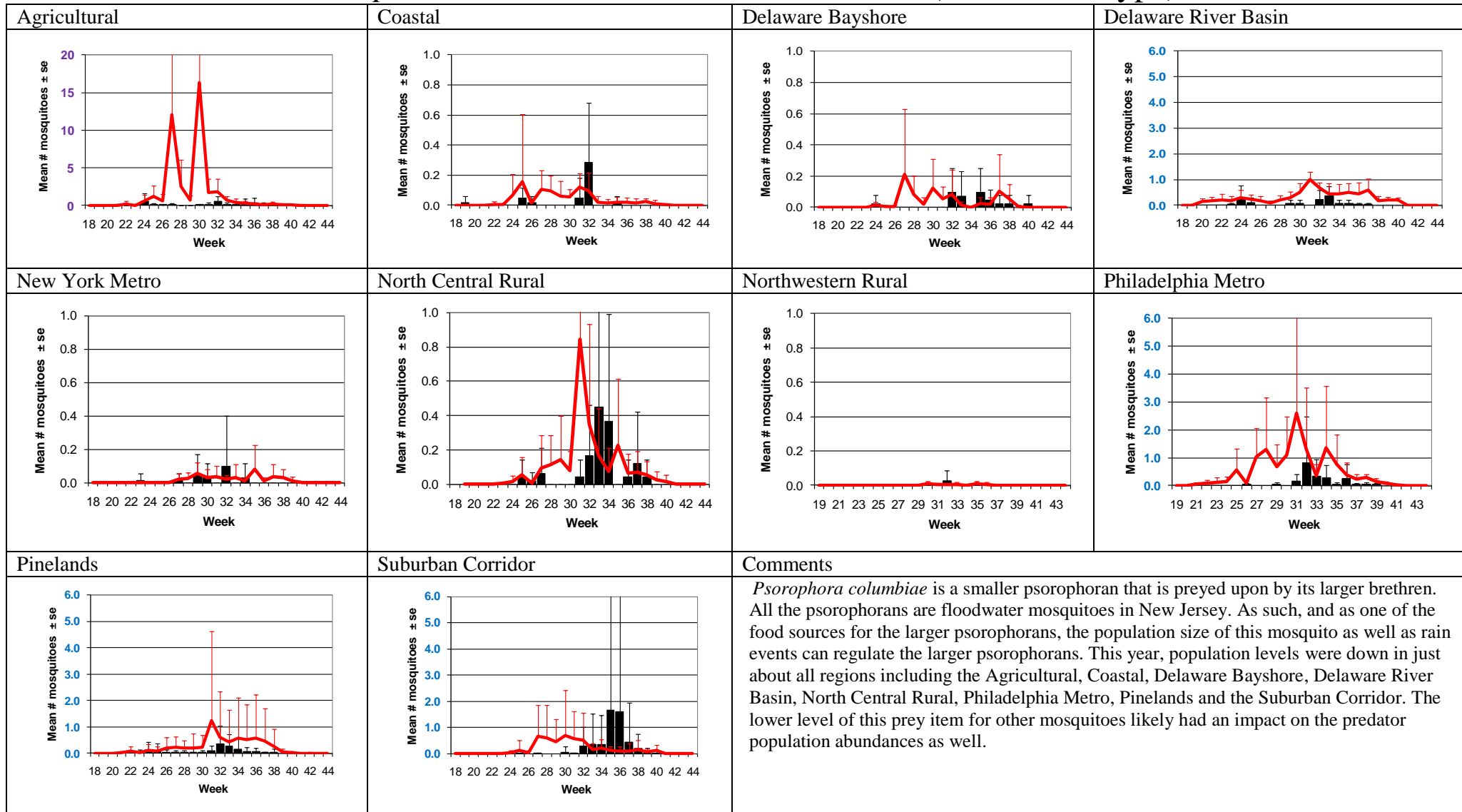


Figure 20.

Psorophora ciliata – Multivoltine Aedine (Ae. vexans Type)

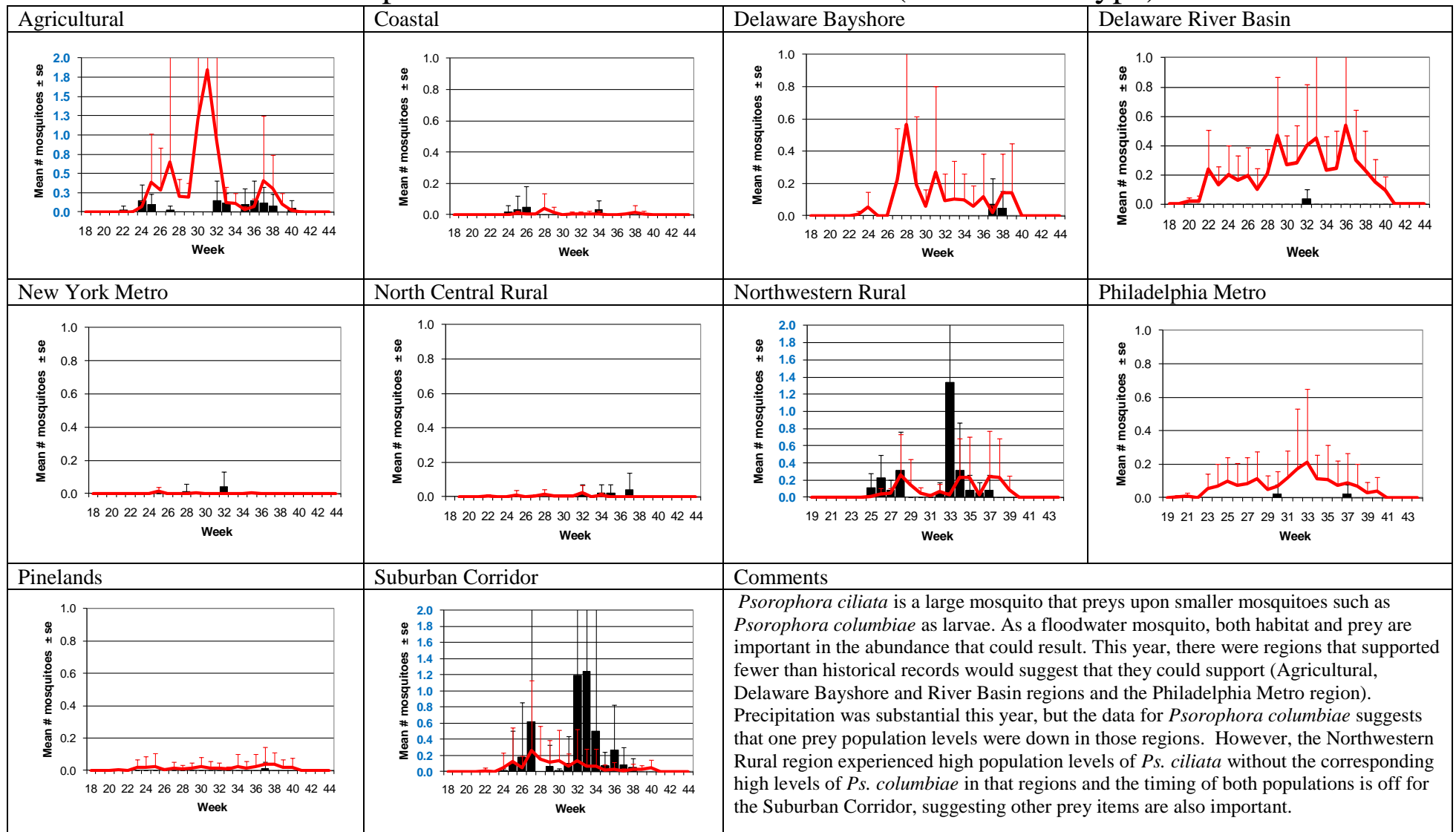


Figure 21.

Psorophora ferox – Multivoltine Aedine (*Ae. vexans* Type)

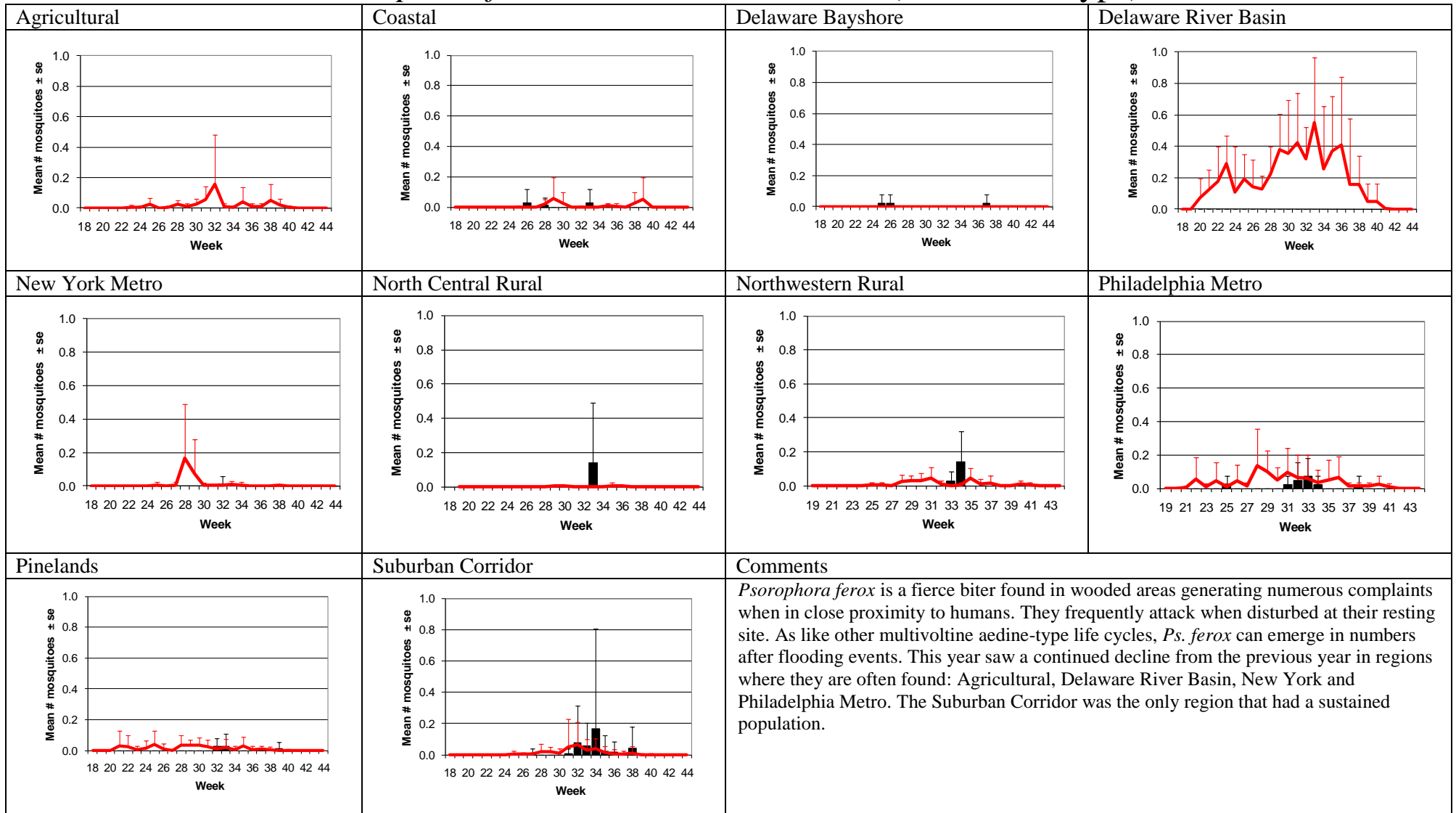


Figure 22.

Aedes sollicitans – Multivoltine Aedine (*Aedes sollicitans* Type)

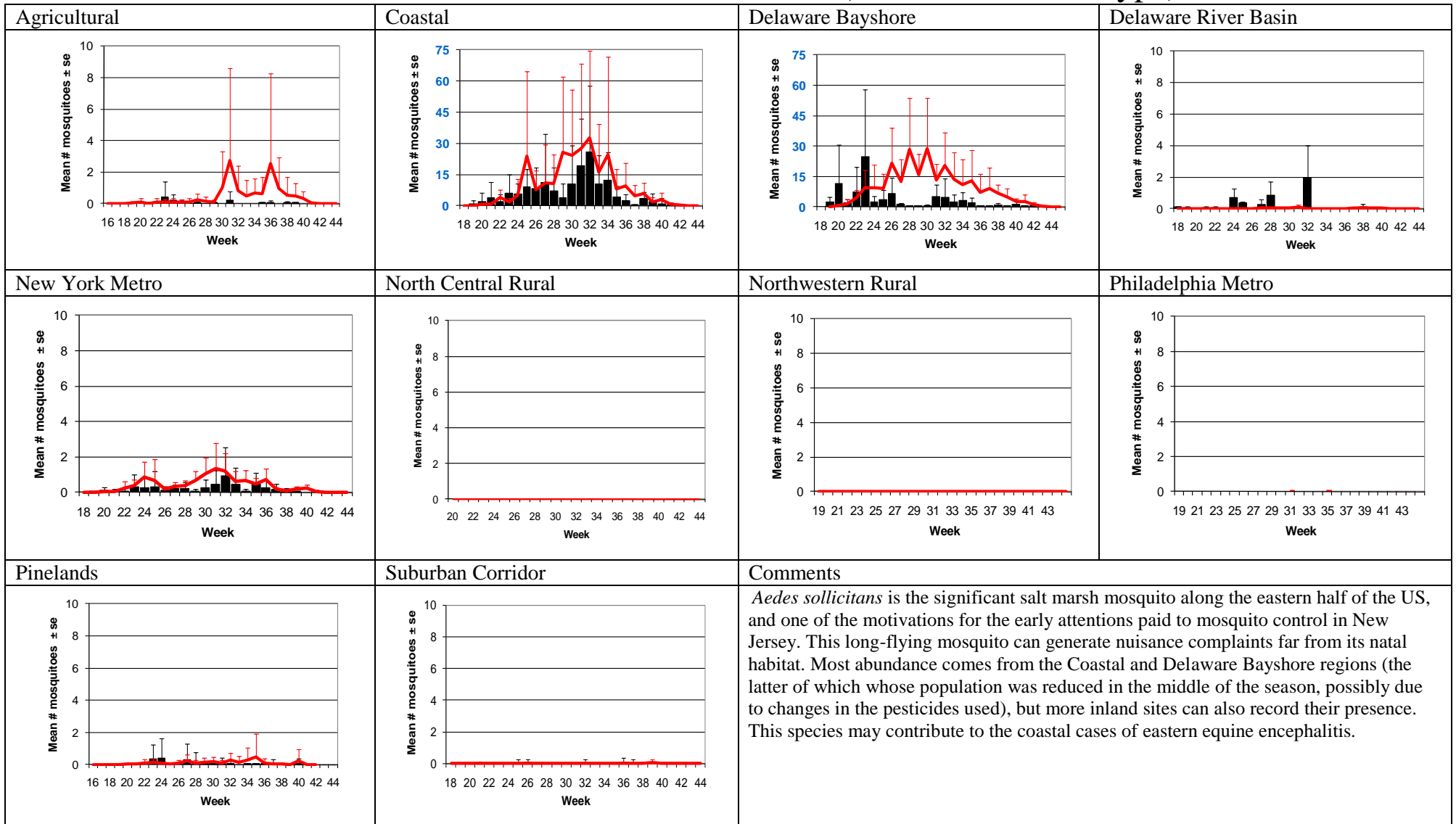


Figure 23.

Aedes cantator – Multivoltine Aedine (*Aedes sollicitans* Type)

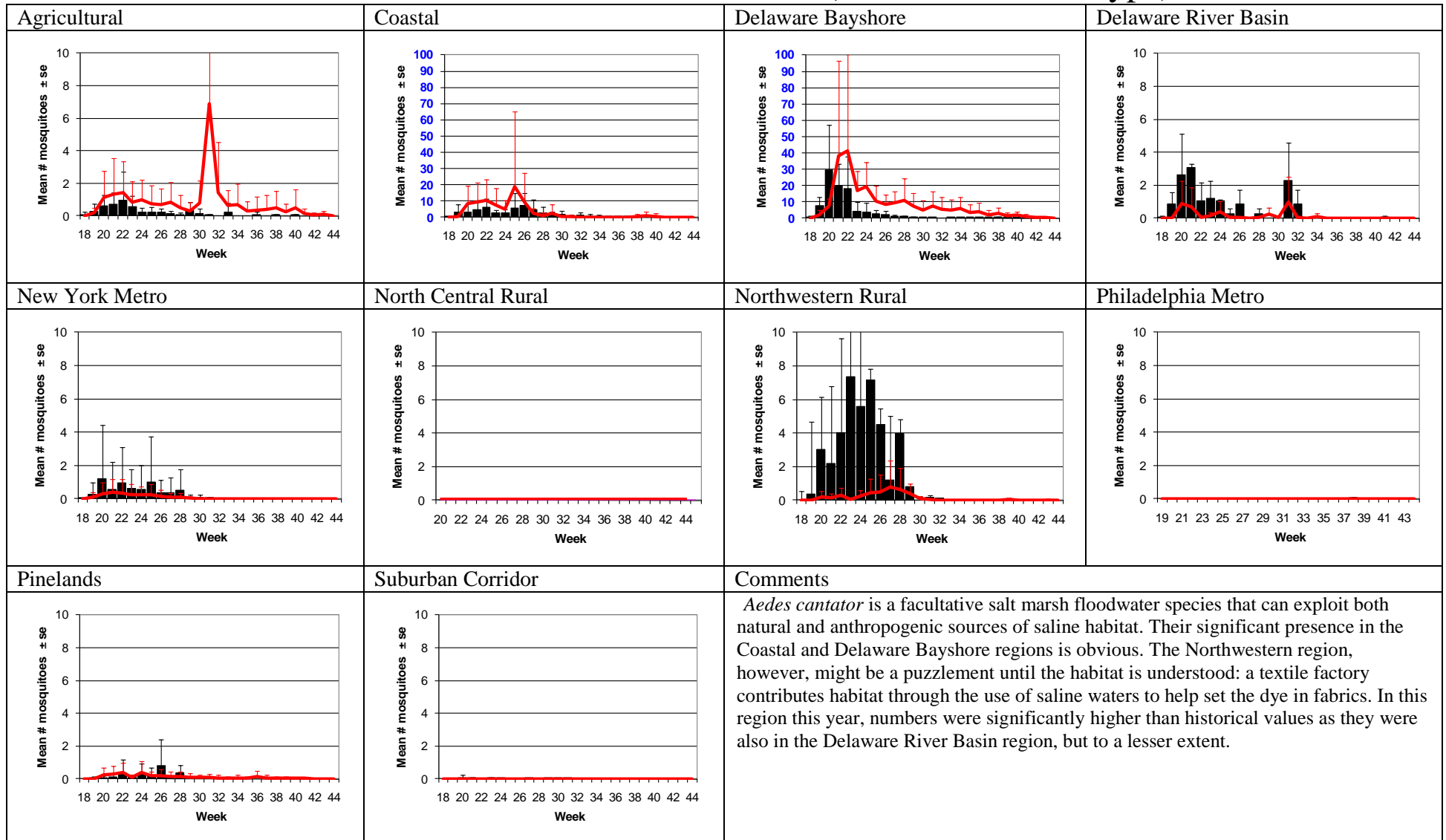


Figure 24.

Aedes taeniorhynchus – Multivoltine Aedine (*Aedes sollicitans* Type)

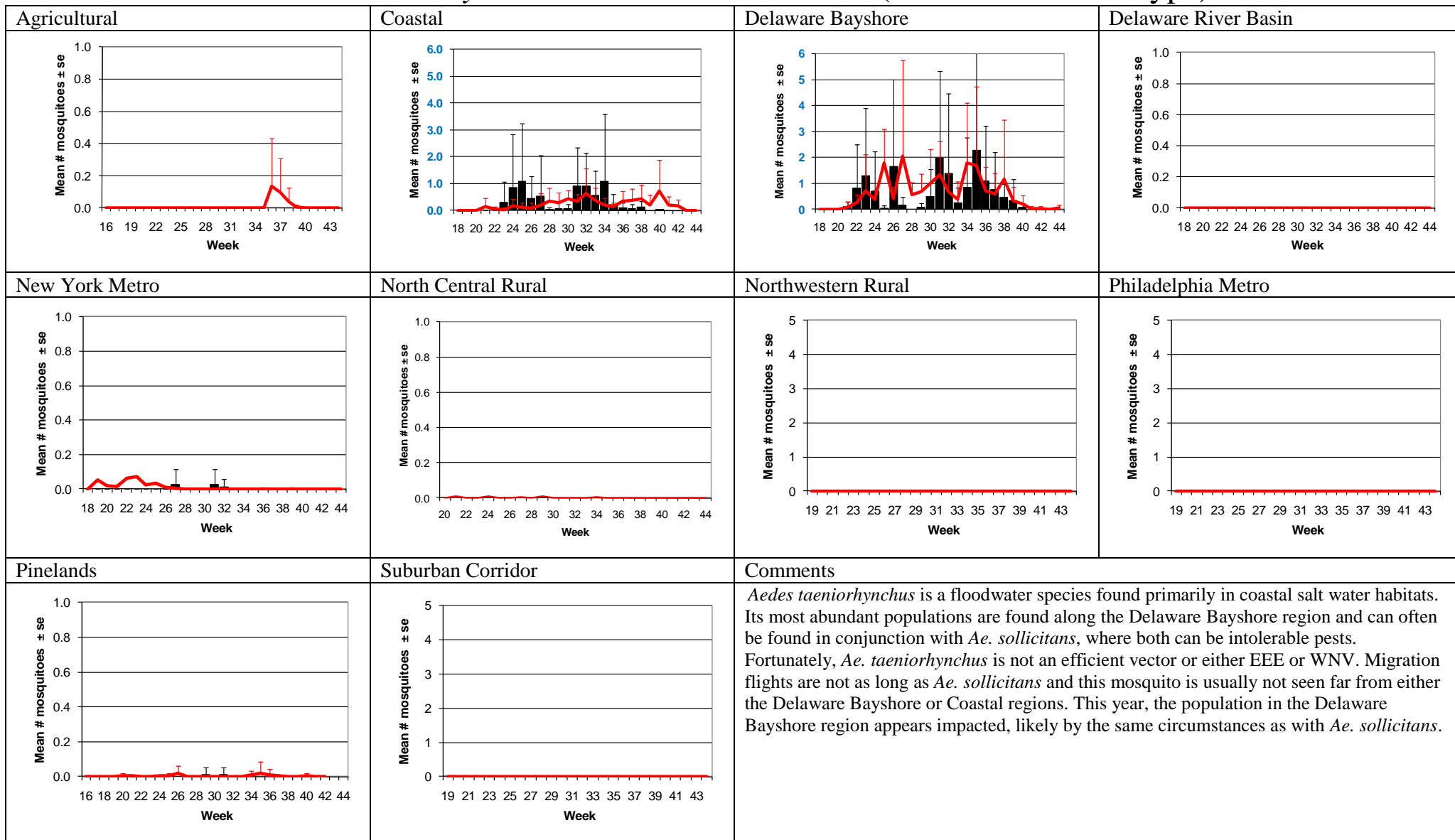


Figure 25.

Aedes triseriatus – Multivoltine Aedine (*Aedes triseriatus* Type)

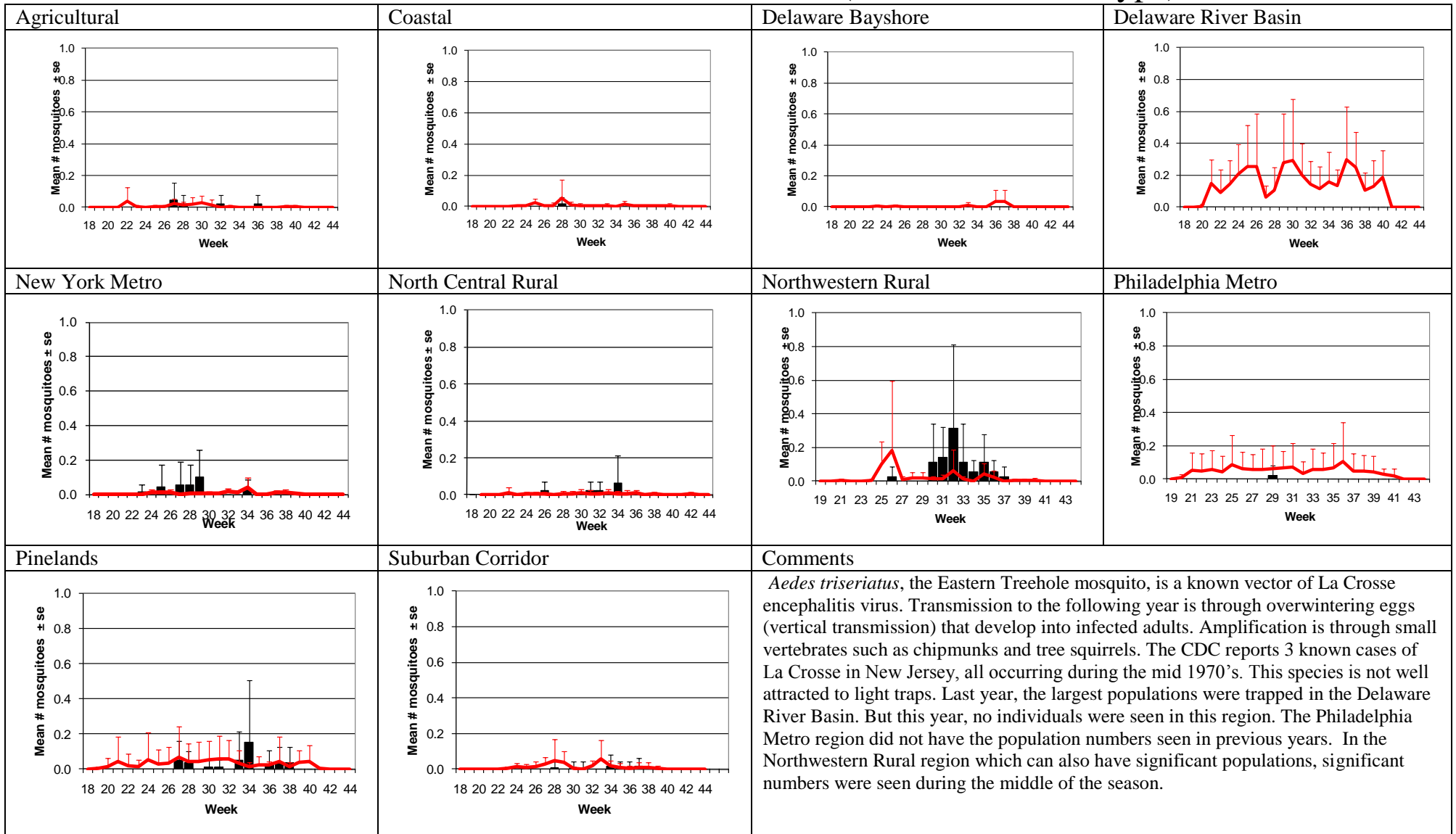


Figure 26.

Aedes japonicus – Multivoltine Aedine (*Aedes triseriatus* Type)

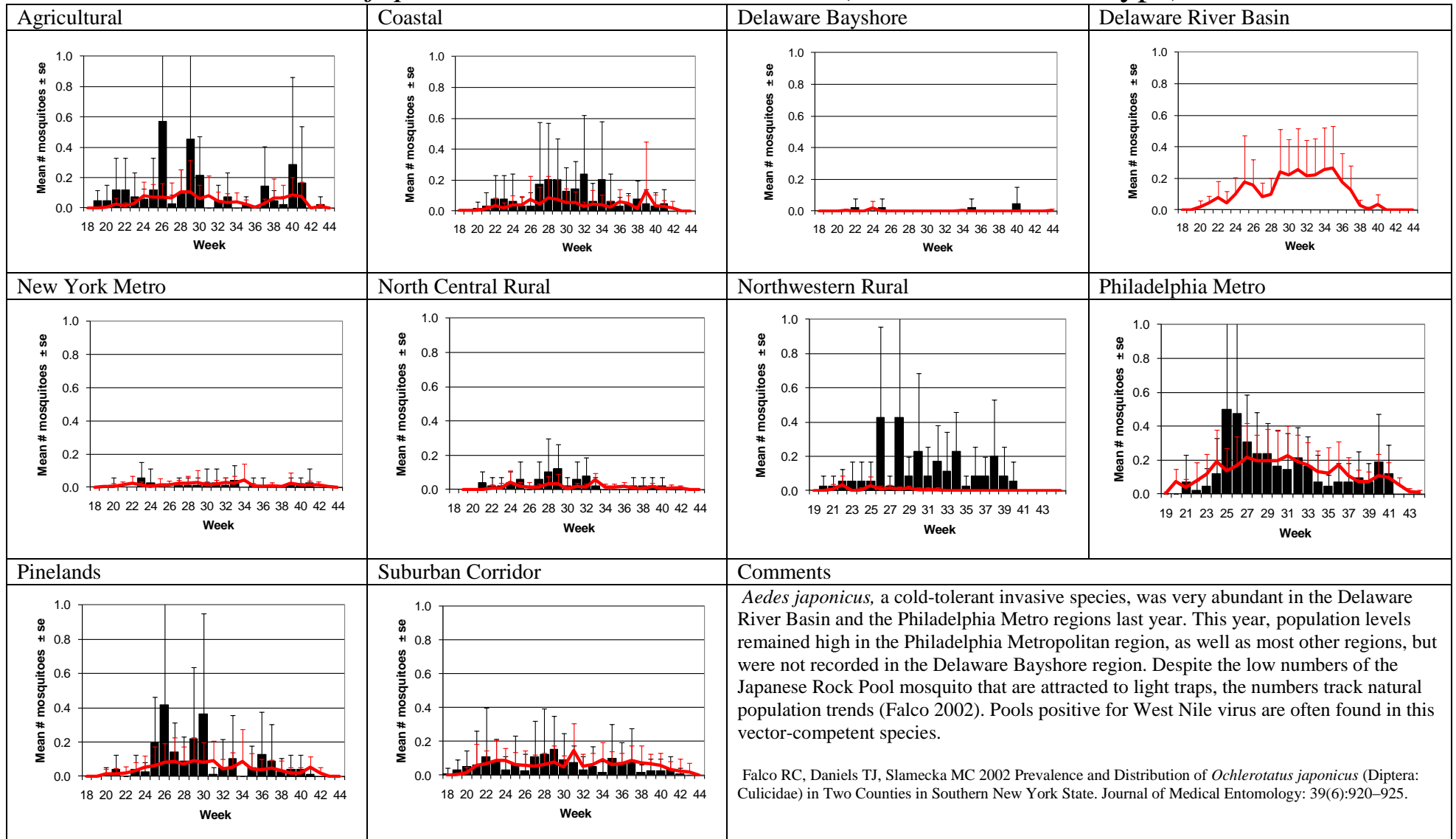


Figure 27.

Aedes albopictus – Multivoltine Aedine (*Aedes triseriatus* Type)

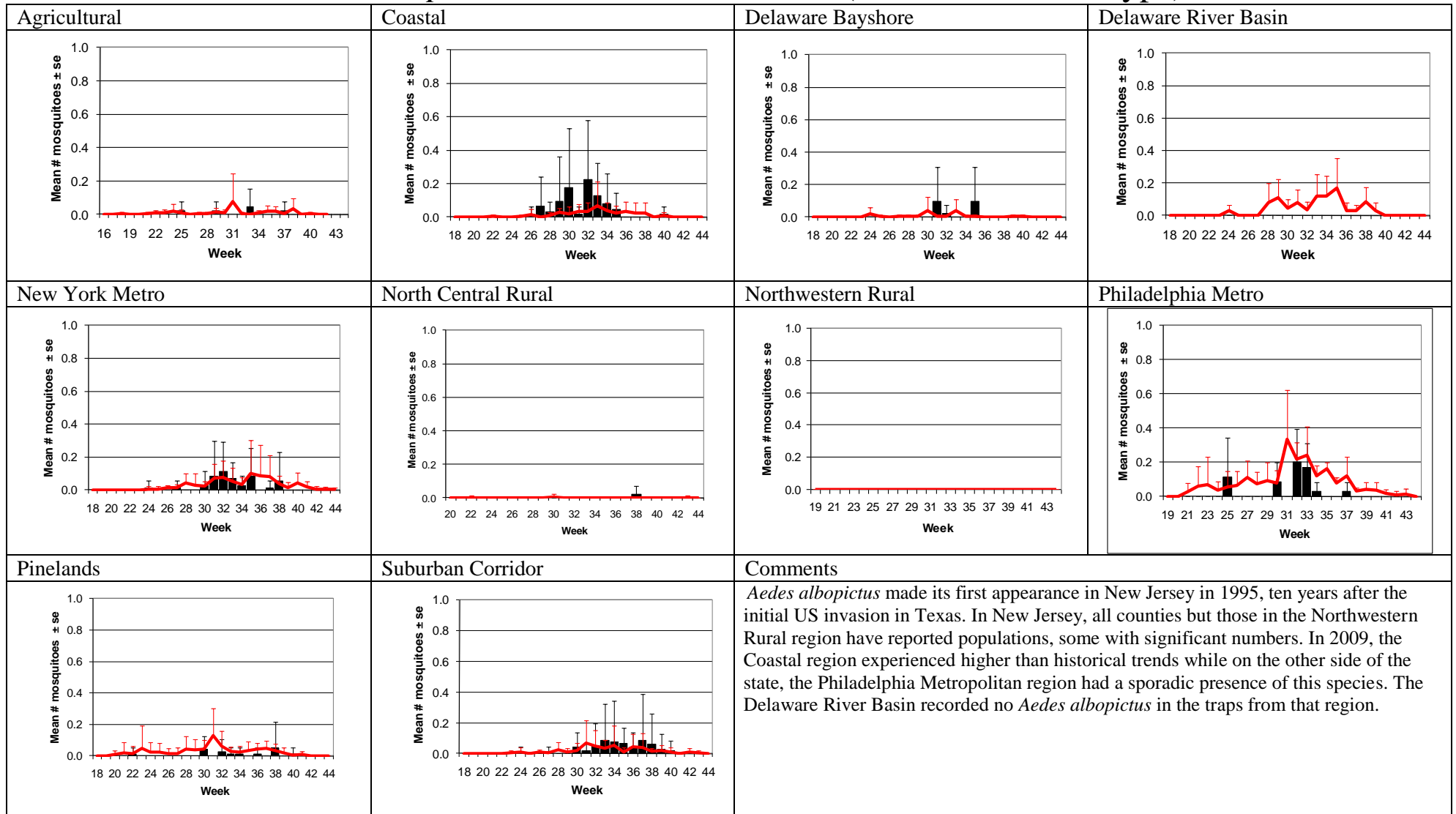


Figure 28.

Anopheles quadrimaculatus – *Culex/Anopheles* (*An. quadrimaculatus* Type)

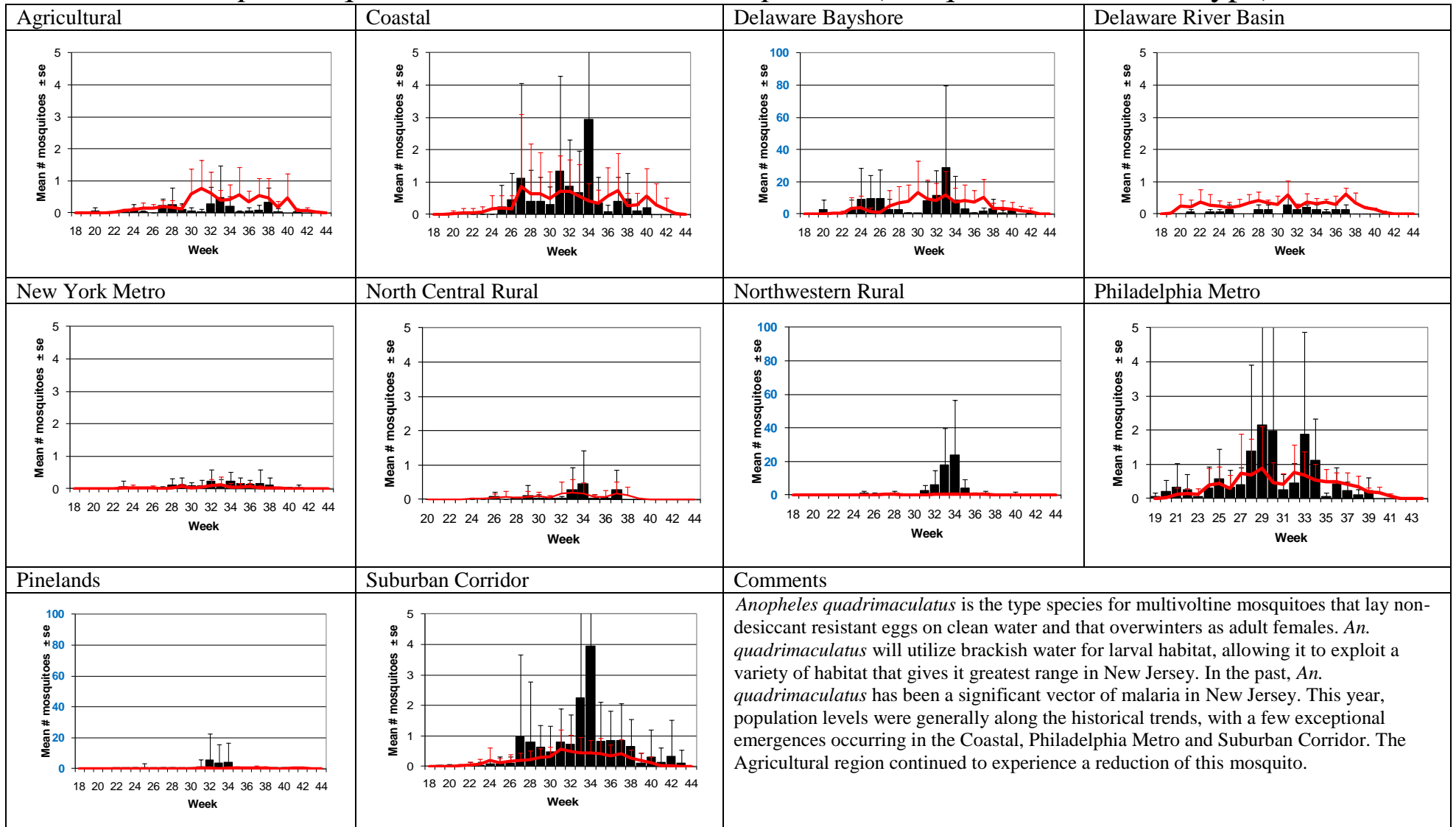


Figure 29.

Uranotaenia sapphirina – *Culex/Anopheles (An. quadrimaculatus Type)*

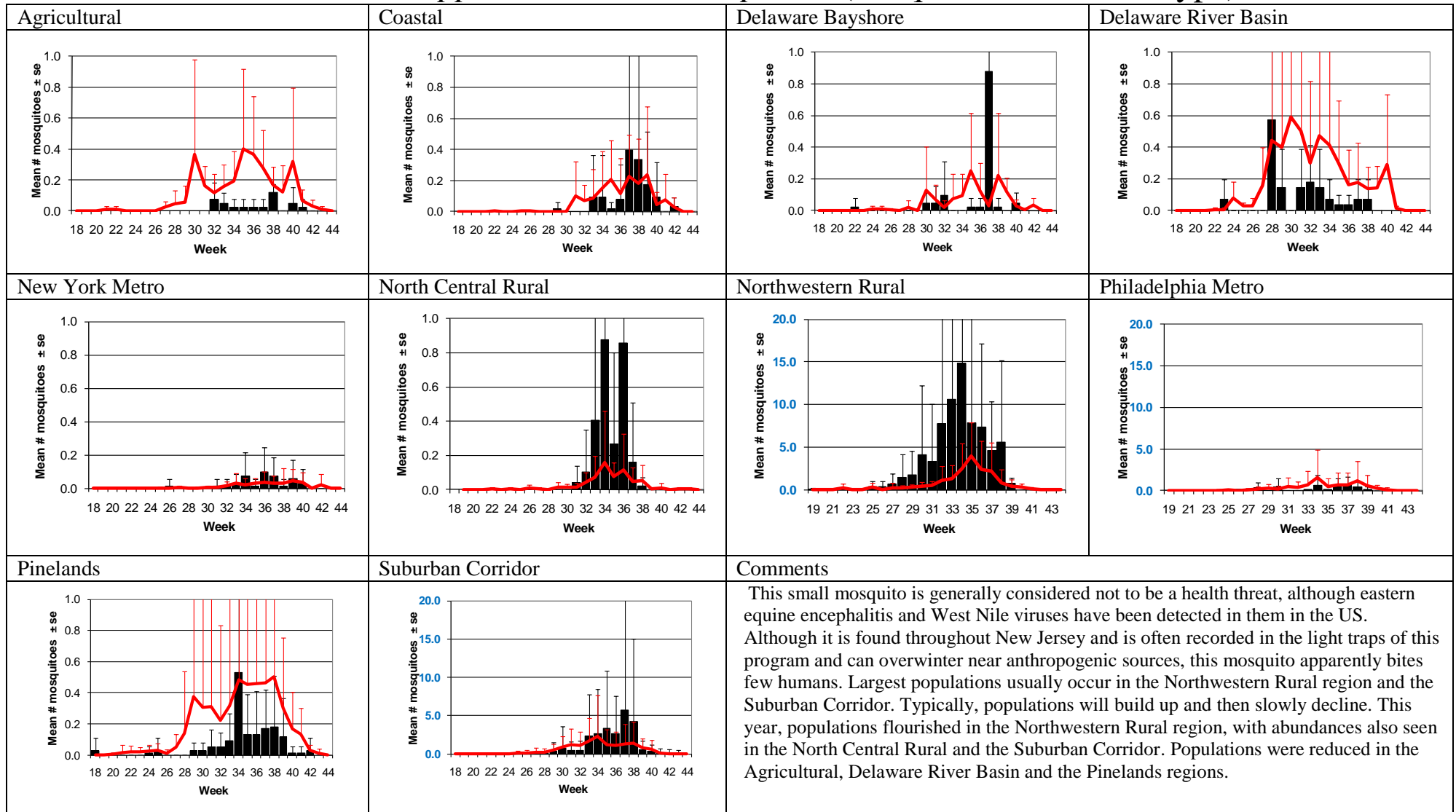


Figure 30.

Culex erraticus – *Culex/Anopheles* (*An. quadrimaculatus* Type)

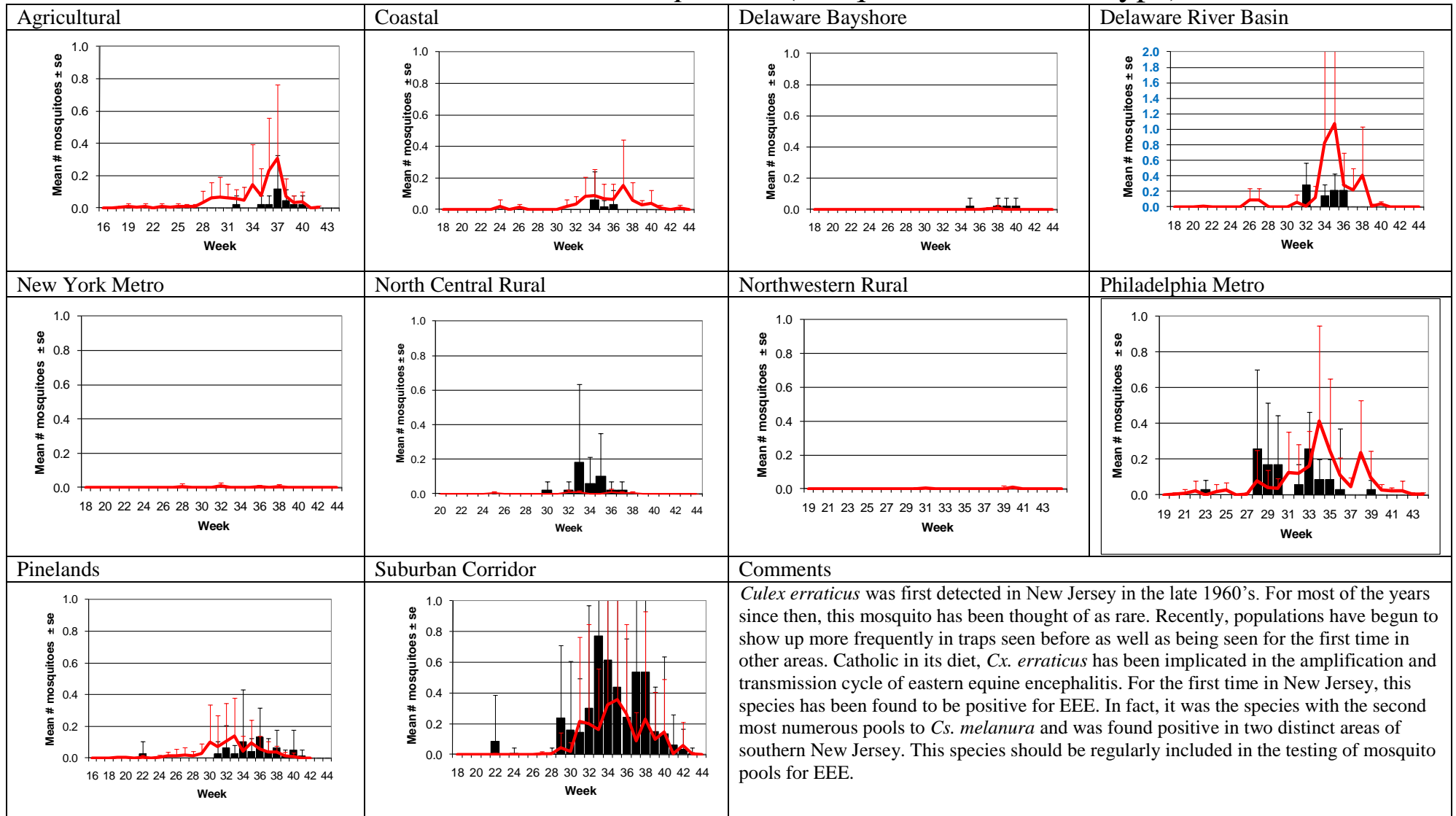


Figure 31.

Culex territans – *Culex/Anopheles* (*An. quadrimaculatus* Type)

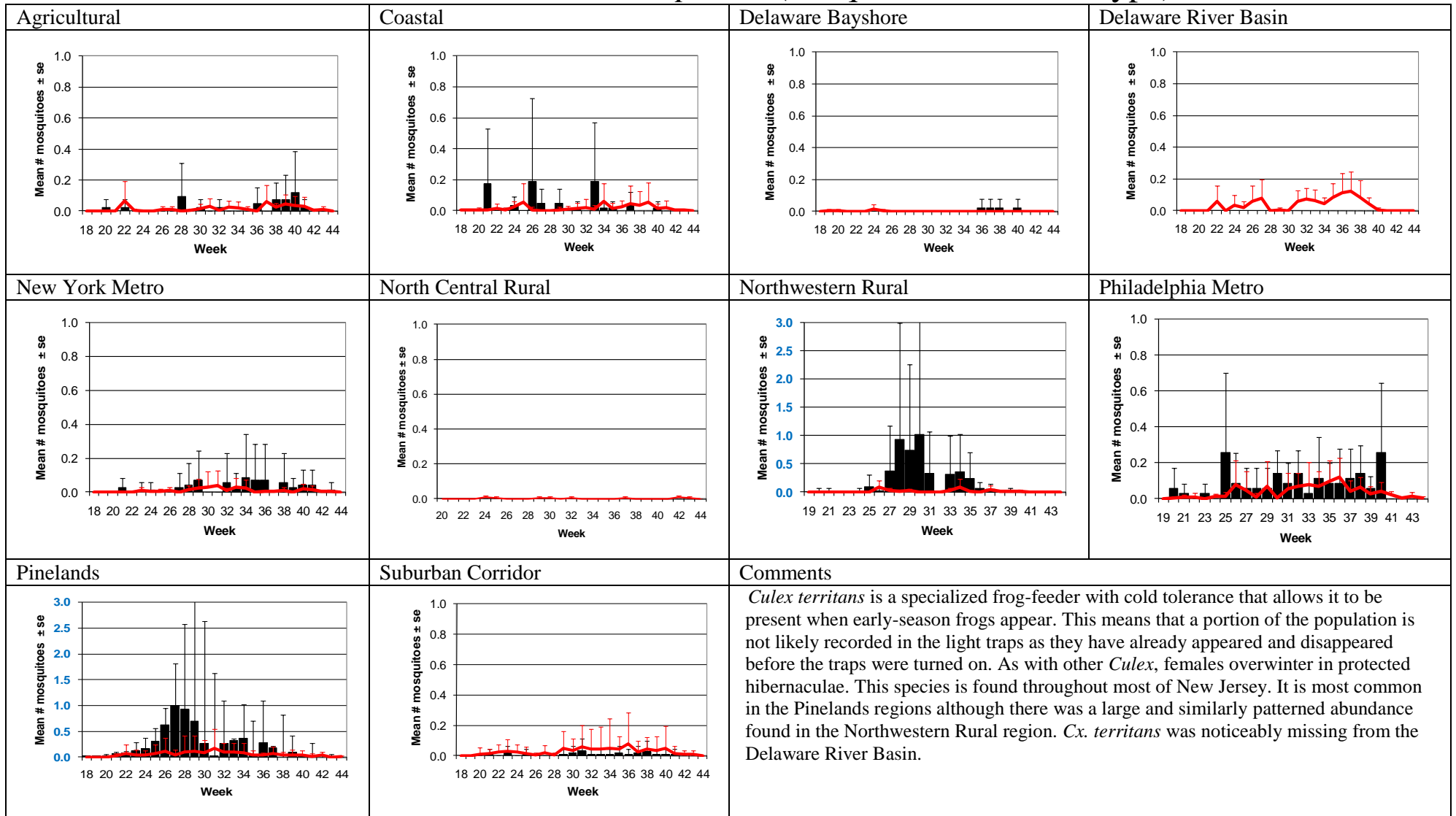


Figure 32.

Anopheles bradleyi – *Culex/Anopheles (Cx. salinarius Type)*

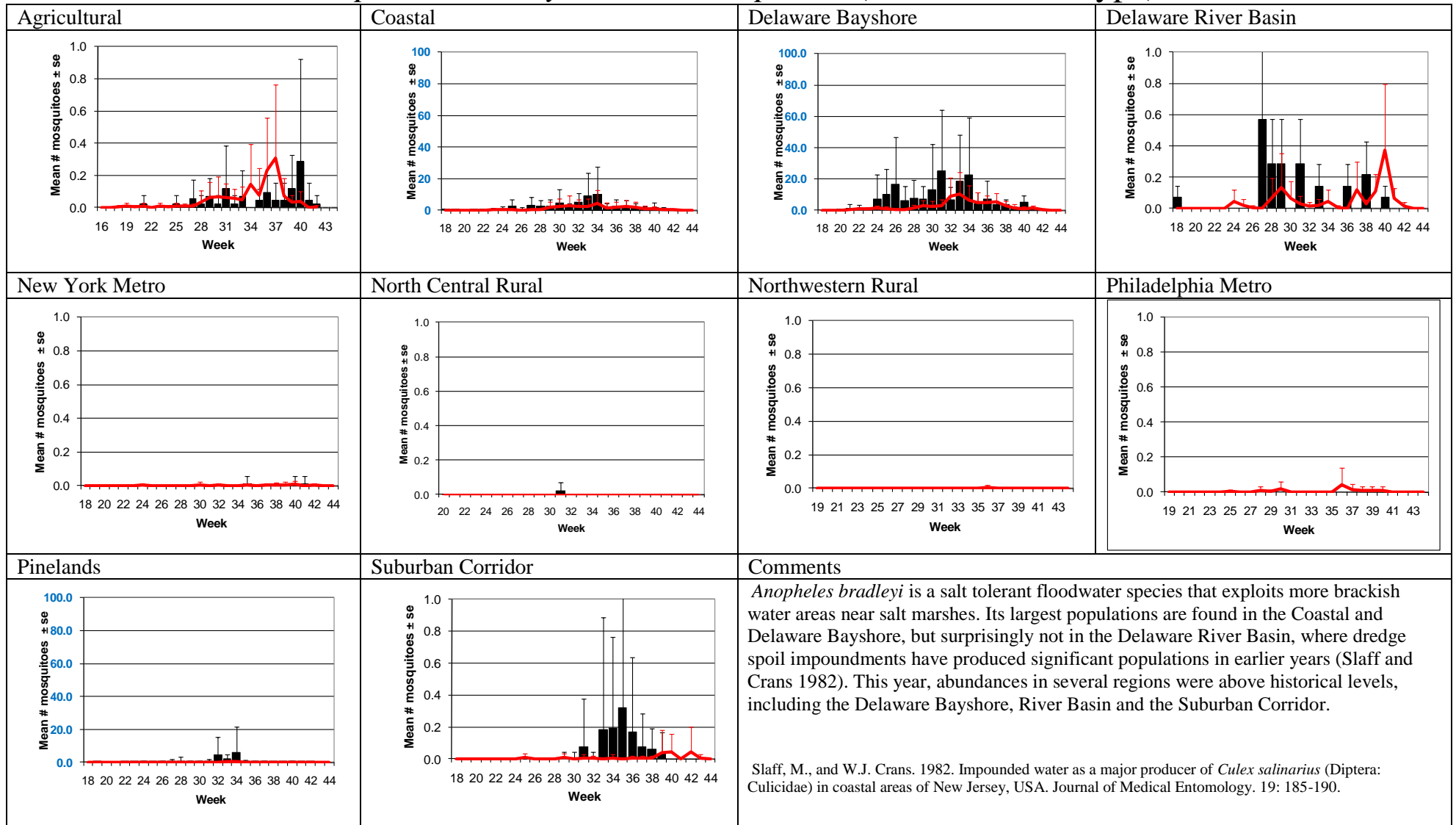


Figure 33.

Mixed *Culex* spp. – *Culex/Anopheles* (*Cx pipiens/salinarius* Type)

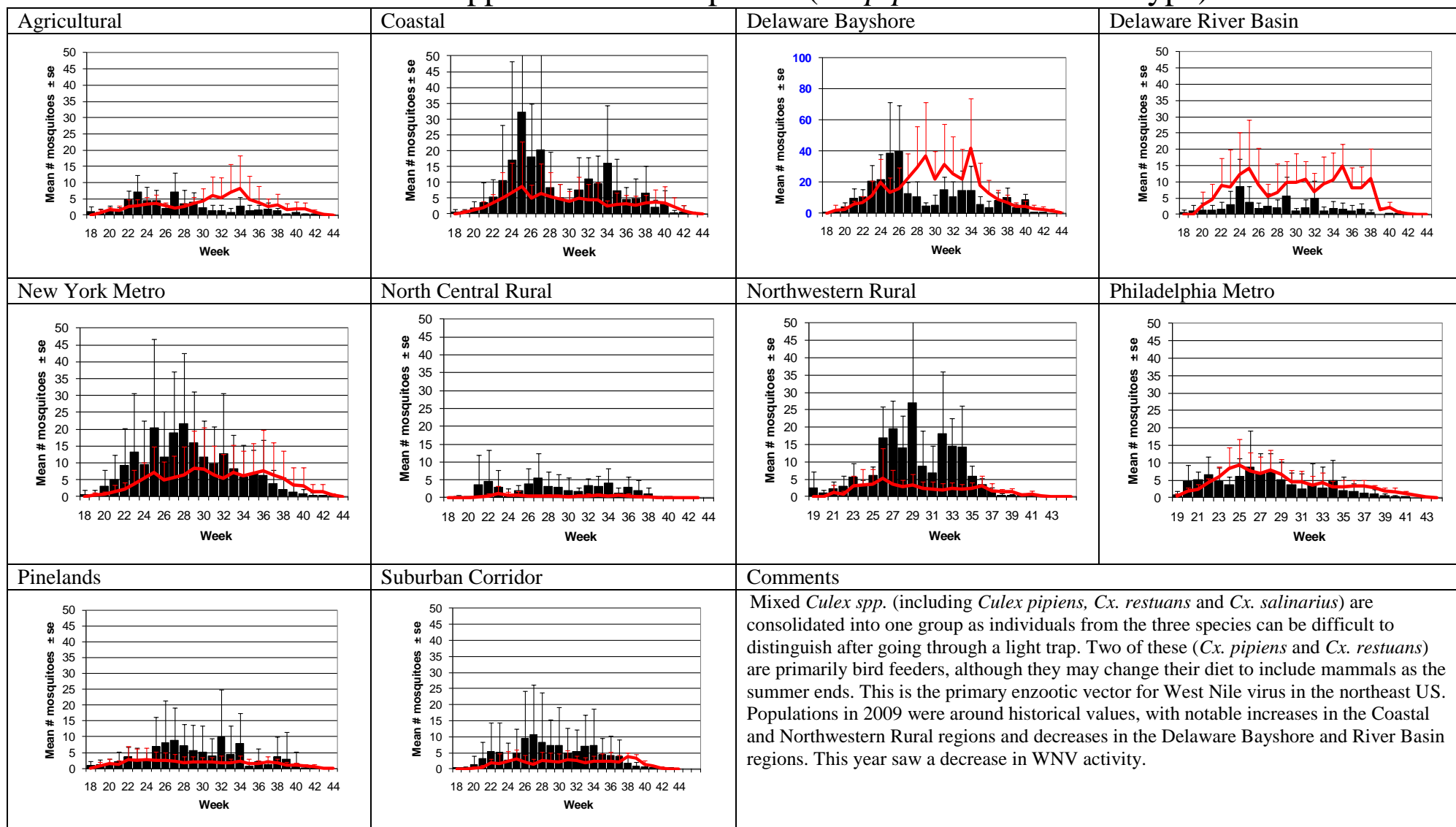


Figure 34.

Anopheles punctipennis – *Culex/Anopheles (Cx pipiens Type)*

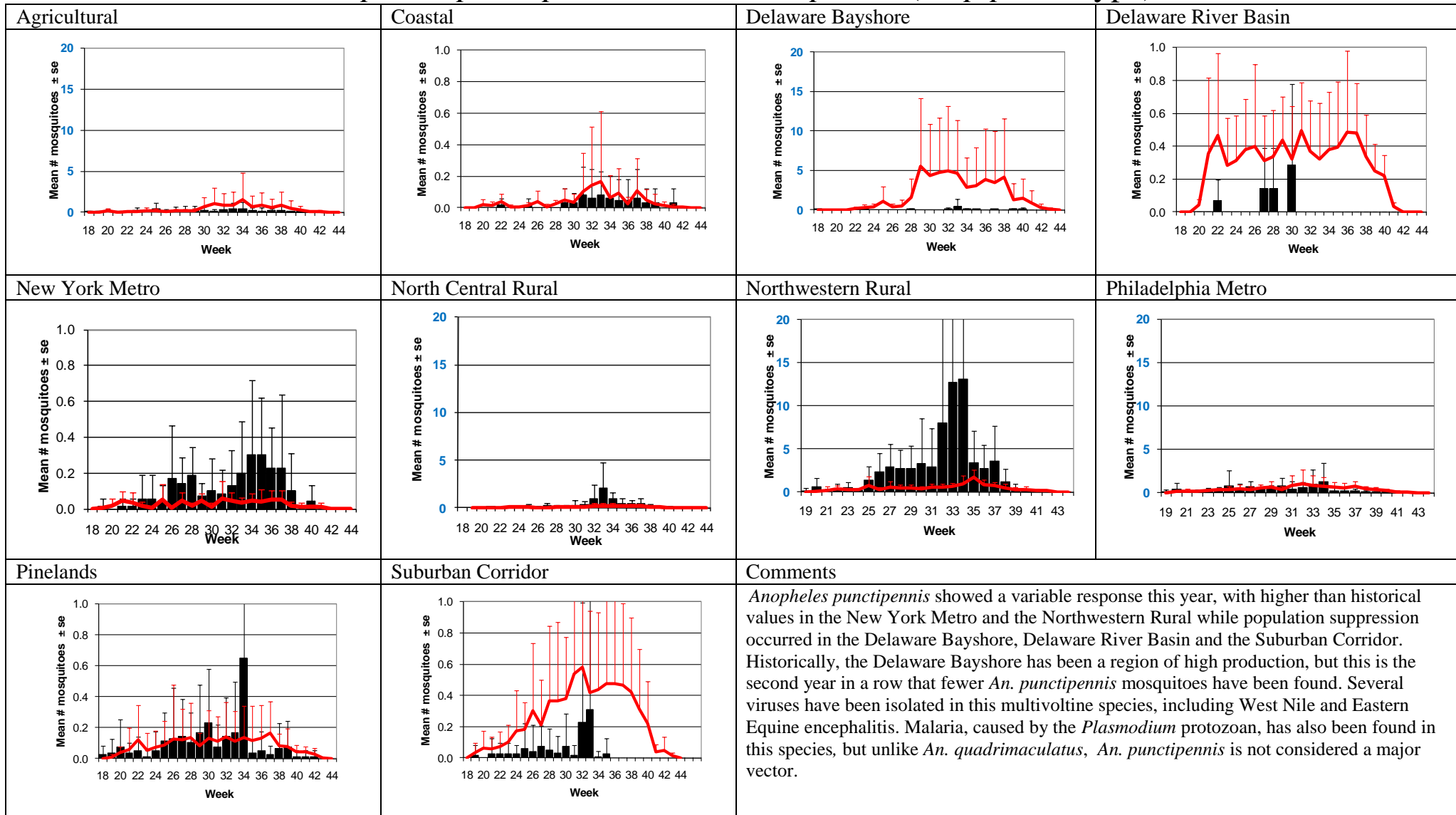


Figure 35.

Culiseta melanura – Unique (*Cs. melanura* Type)

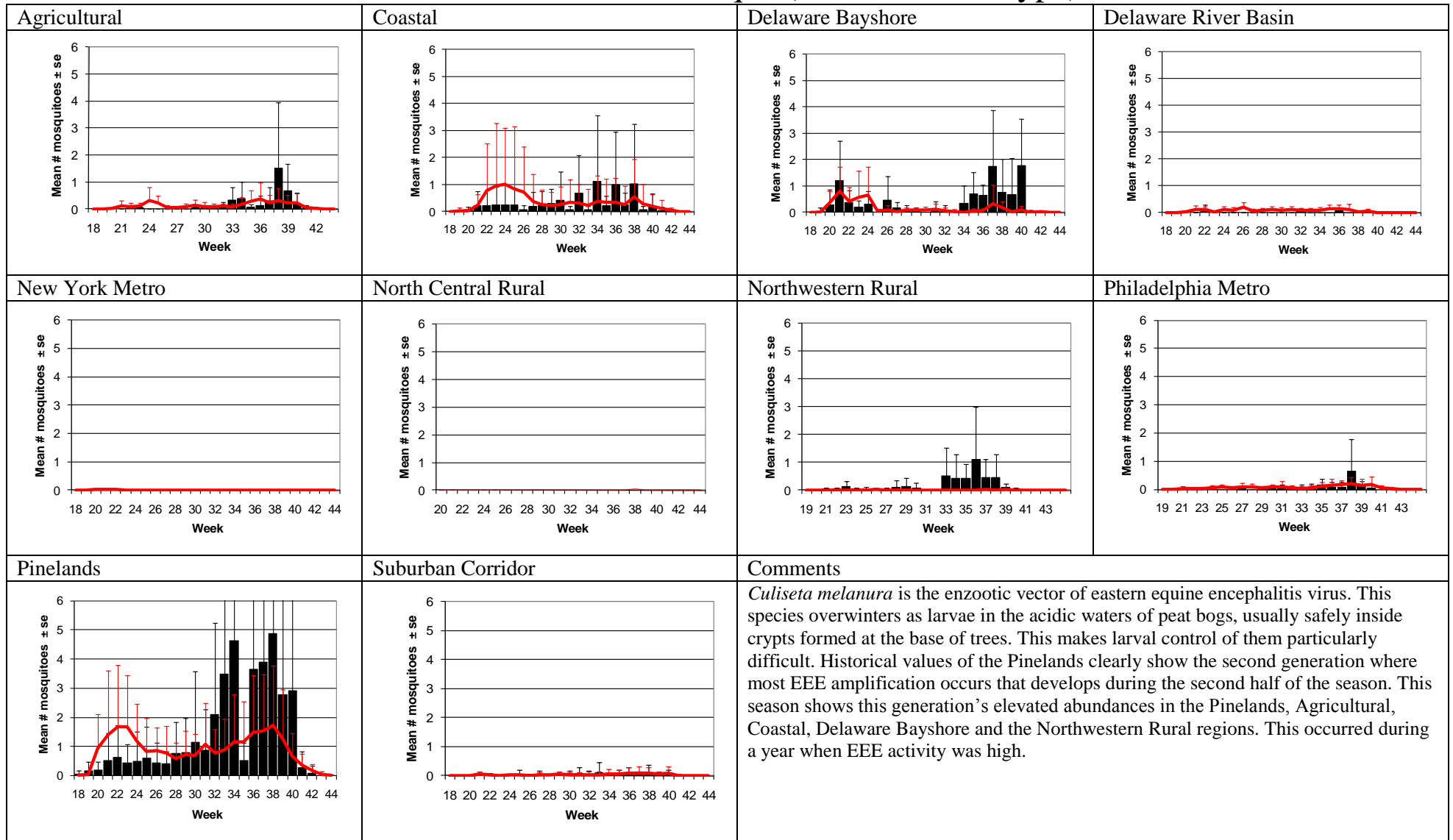


Figure 36.

Anopheles crucians – Unique (*Cs. melanura* Type)

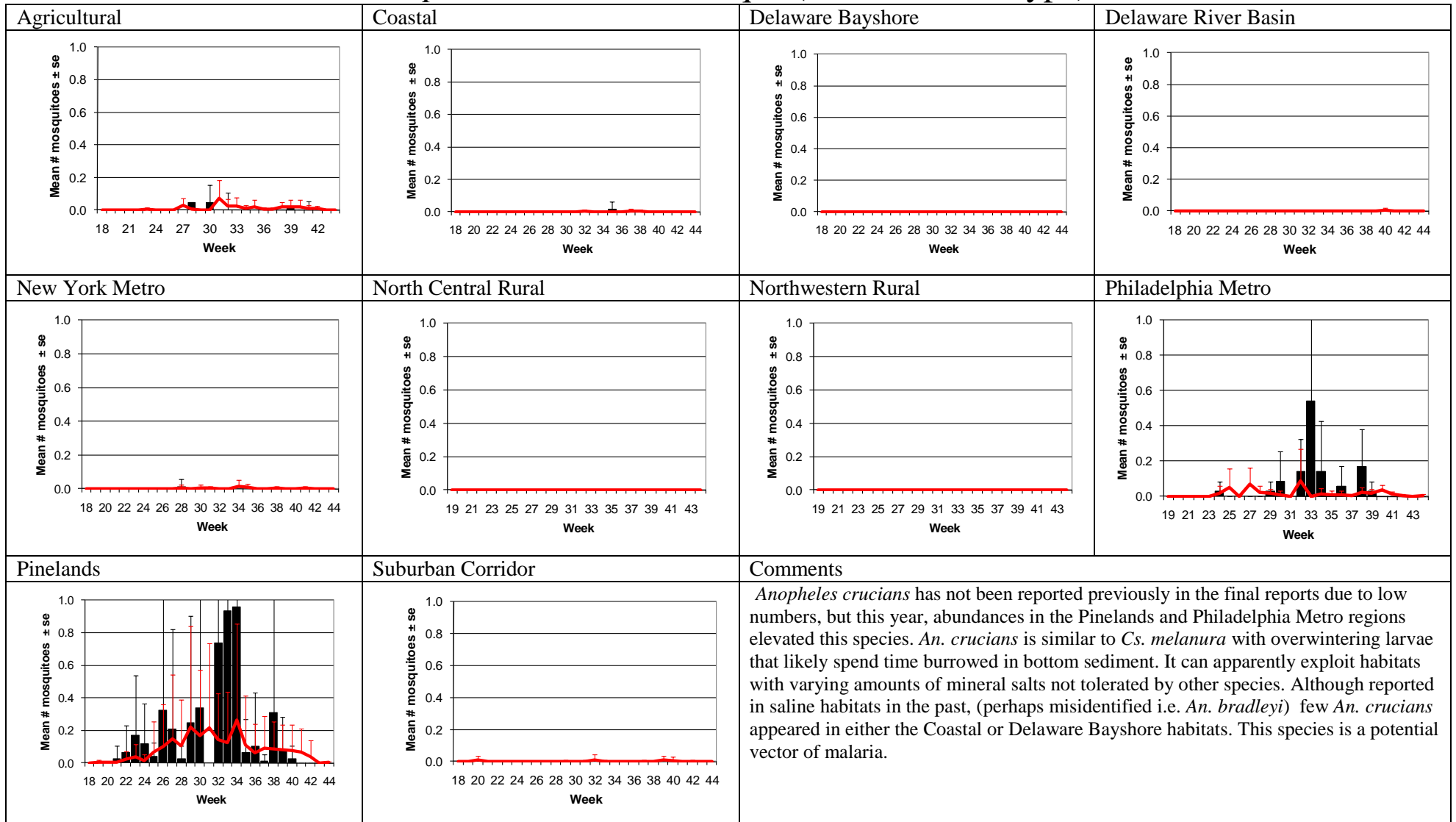


Figure 37.

Coquillettidia perturbans – Miscellaneous Group

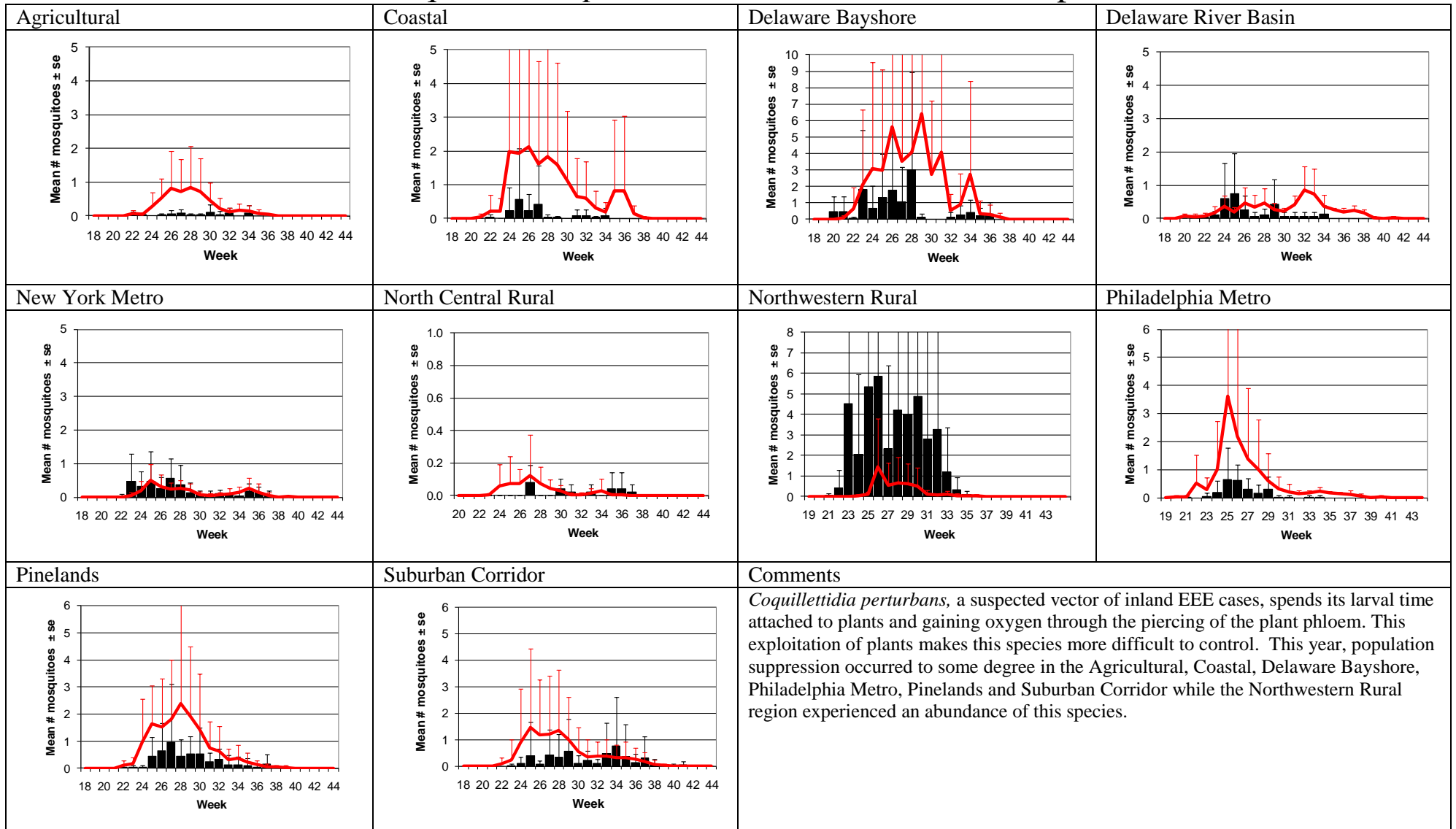


Figure 38.

Anopheles walkeri – Monotypic (*An. walkeri* Type)

