



2023 NEBRASKA MOSQUITO SURVEILLANCE REPORT

NEBRASKA DEPARTMENT OF HEALTH
AND HUMAN SERVICES (NDHHS)

VECTOR-BORNE DISEASE PROGRAM

MMWR WEEK 39

(Week Ending 9/30/2023)

****All Data is Provisional****

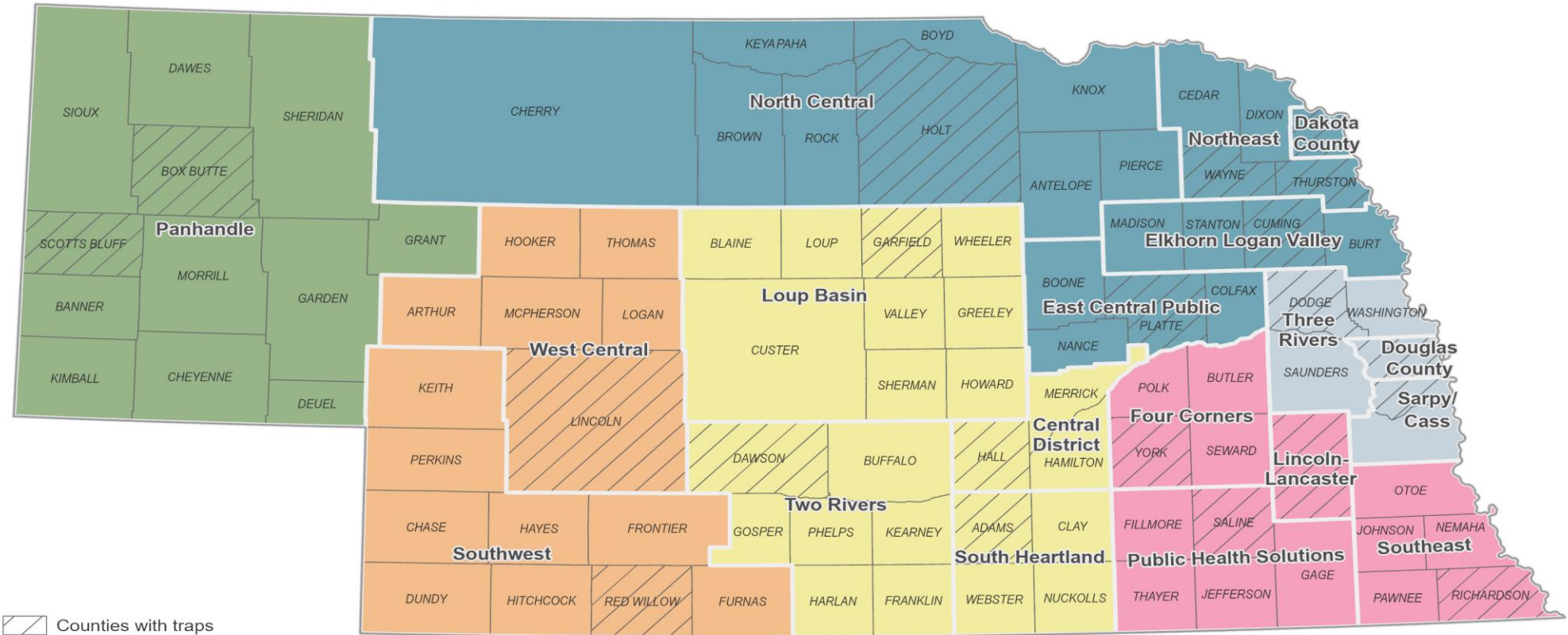
Uranotaenia sapphirine (sapphire-striped mosquito). Credit: Wikipedia
https://en.wikipedia.org/wiki/Uranotaenia_sapphirina#/media/File:Uranotaenia_sapphirina.jpg



Credit: CDC, NCEZID-DVBD

STATEWIDE SUMMARY

2023 Mosquito Surveillance Trapping Regions



-  Counties with traps
-  Counties without traps
-  Local Health Department Boundary
-  Central Vector Surveillance Region
-  Metro Vector Surveillance Region
-  North Vector Surveillance Region
-  Panhandle Vector Surveillance Region
-  Southeast Vector Surveillance Region
-  West Central Vector Surveillance Region



Nebraska Adult Mosquito Trap Indexes Summary Table Week 39*

Region	Total Mosquitoes	Aedes species	Invasive Aedes species	Anopheles species	Culex species	Culiseta species	Coquillettidia perturbans
Statewide	1	1	1	1	2	1	1
Southeast	2	3	1	2	3	1	1
Metro	1	1	5	3	1	1	1
North	1	1	0	3	3	1	1
South Central	2	1	0	2	2	1	1
West Central	1	1	0	1	1	1	1
Panhandle	3	3	0	3	3	2	1

*Activity levels are described in relative terms based on historical data from at most the previous 5 years. Activity levels correspond to: **0 = no historical data**, **1 = well below average (≤50% of avg.)**, **2 = below average (51-90% of avg.)**, **3 = near average (91-150% of avg.)**, **4 = above average (151-300% of avg.)**, **5 = well above average (>300% of avg.)**.

Nebraska Adult Mosquito Trap Indexes Trend Table Week 39**

Region	Total Mosquitoes	Aedes species	Invasive Aedes species	Anopheles species	Culex species	Culiseta species	Coquillettidia perturbans
Statewide	-2	-1	1	-1	-2	2	0
Southeast	-1	1	1	0	-1	4	0
Metro	-1	1	0	0	-1	4	0
North	-2	-1	NA	-1	-2	4	0
South Central	-2	-2	NA	-1	-2	-2	0
West Central	-1	-1	NA	-1	-1	0	0
Panhandle	-2	-2	NA	-2	-2	-1	0

**Trend levels are calculated by looking at the percent change of the trap index from the recent sampling period compared to the previous period. Trend levels correspond to: -4 = significant decrease (< -150%), -3 = large decrease (-100 to -150%), -2 = moderate decrease (-50 to -100%), -1 = mild decrease (-10 to -150 %), 0 = stable (-10 to 10%), 1 = mild increase (10 to 50%), 2 = moderate (50 to 100 %), 3 = large increase (100 to 150%), 4 = significant increase (> 150%).

Common Mosquito Species in Nebraska

- *Aedes species* group
 - Made up of mostly flood water species mosquitoes. With abundant precipitation these species can emerge in very large numbers. *Aedes vexans* and *Aedes trivittatus* are typically the most abundant species collected from traps.
- Invasive *Aedes species* group
 - Three invasive (non-native) mosquito species are the main targets of this surveillance. They are *Aedes aegypti* (the yellow fever mosquito), *Aedes albopictus* (the tiger mosquito), and *Aedes japonicus*. All three species are small black mosquitoes with white stripes on their back and on their legs. They can lay eggs in any small artificial or natural containers that hold water.
 - Historically, only *Aedes albopictus* and *Aedes japonicus* have been detected in Nebraska.
 - In 2019, *Aedes aegypti* was detected for the first time in the state in York County (city of York), Nebraska. *Aedes aegypti* was again detected in Jefferson County (city of Fairbury) in 2020.
 - Response activities included efforts to identify the area of infestation, determine population size, eliminate larval habitat, and try to determine where/how these mosquitoes became established.
 - Follow up surveillance for *Aedes aegypti* in York and Fairbury in 2020 and 2021 did not detect any additional specimens.
 - *Aedes aegypti* and *Aedes albopictus* have the potential to transmit several viruses, including dengue, chikungunya, Zika, and yellow fever. However, none of these viruses are known to be transmitted within Nebraska, but people are infected with these viruses in other parts of the world, including Mexico, Central and South America, the Caribbean, and Asia.

Common Mosquito Species in Nebraska

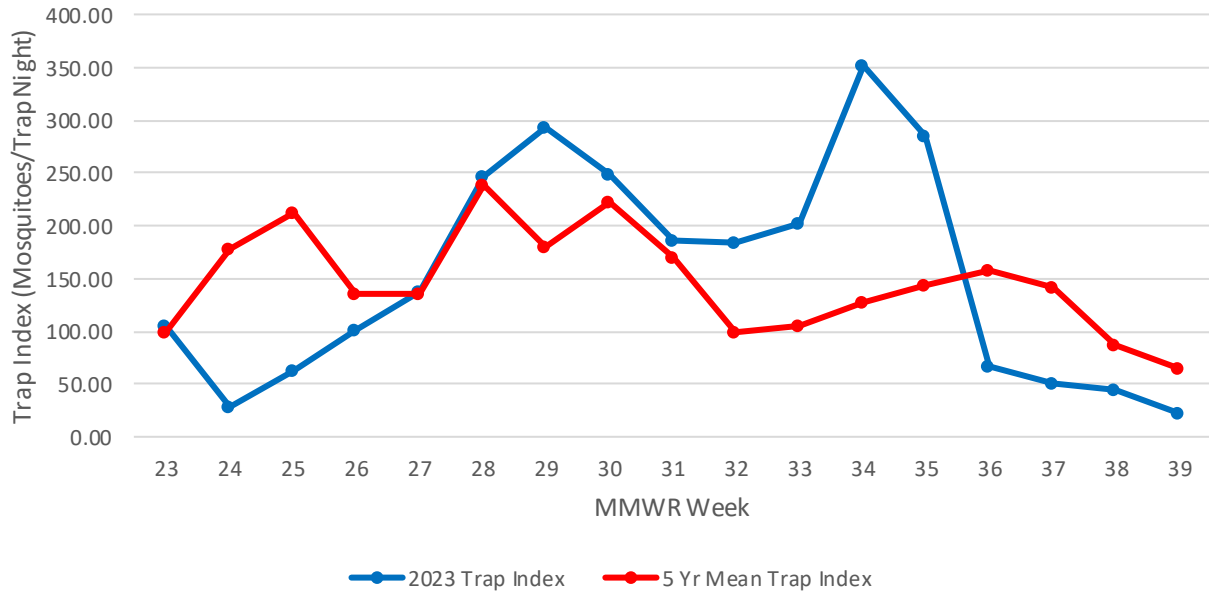
- *Anopheles species* group
 - In general, this groups breeds in permanent to semi-permanent water bodies. This group is well known for being the vector for malaria parasites which is not endemic in the U.S. Some species may also transmit West Nile virus.
- *Culex species* group
 - Composed of *Culex erraticus*, *Culex pipiens*, *Culex restuans*, *Culex salinarius*, and *Culex tarsalis*. Three species (*pipiens*, *restuans*, and *salinarius*) are often difficult to tell apart after going through the fan blades of the CDC light trap and are pooled together for testing. This group is the primary vector for West Nile virus, St. Louis encephalitis virus, and Wester Equine encephalitis virus.
- *Culiseta species* group
 - This group is primarily composed of *Culiseta inornata*. This species emerges earlier than many other species in the state and are often the first and last species to be active in the mosquito season. This species is a potential vector for West Nile virus.
- *Coquillettidia perturbans* species
 - This species is often referred to as the cattail mosquito. This mosquito breeds in areas that have cattails or emergent aquatic vegetation. This species typically has one large peak of activity that occurs in mid-July. The species is a nuisance and is also a potential vector for West Nile virus and Eastern Equine encephalitis virus (not currently found in Nebraska).



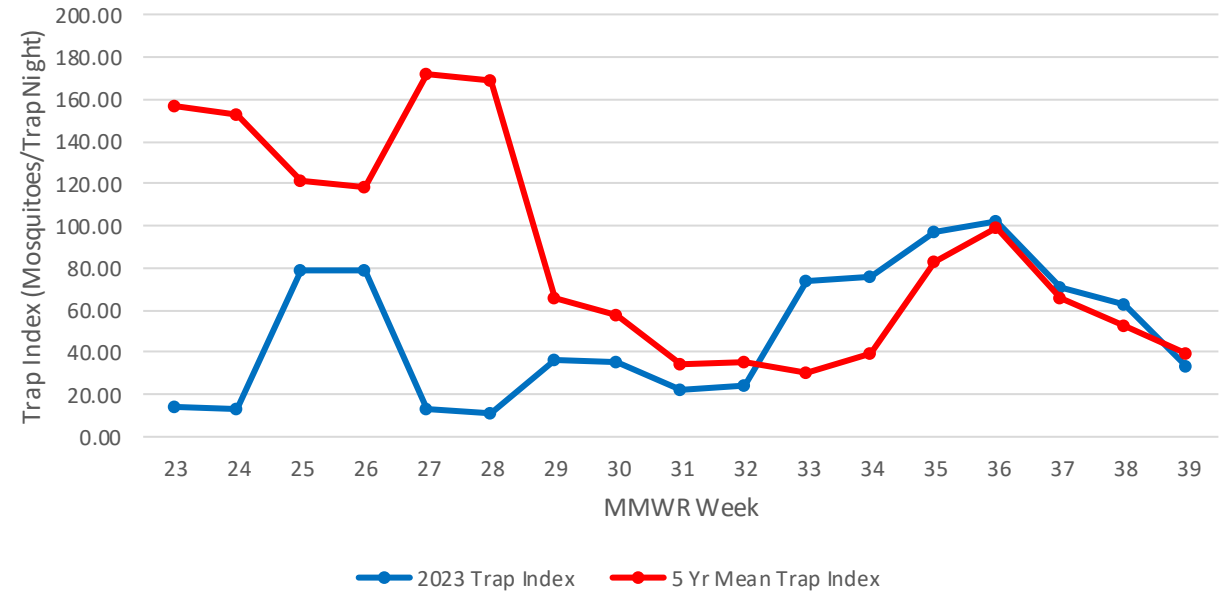
Culex quinquefasciatus. Credit: CDC,
NCEZID-DVBD

SPECIES GRAPHS: TOTAL MOSQUITOES

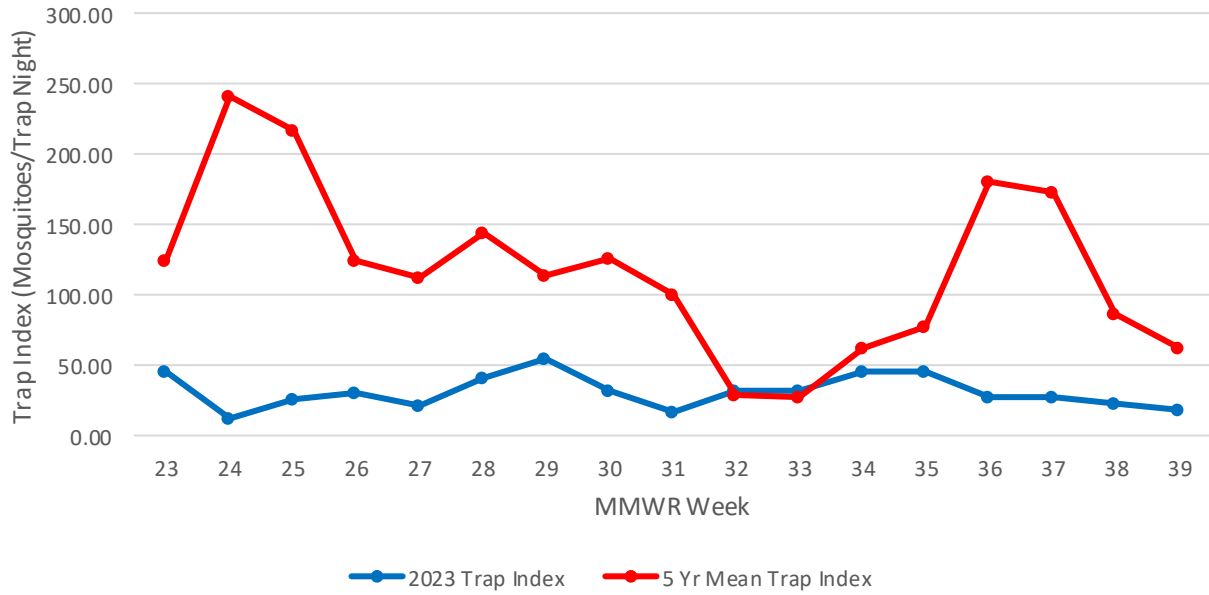
Total Mosquito Trap Index Nebraska Statewide, 2023



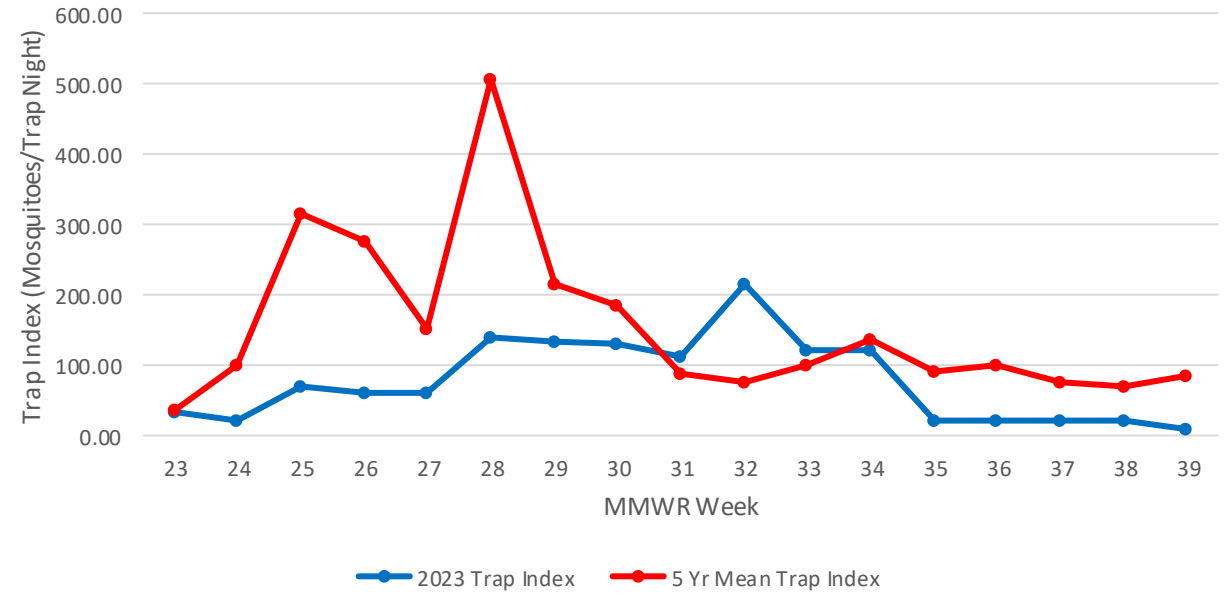
Total Mosquito Trap Index Southeast Vector Region, 2023



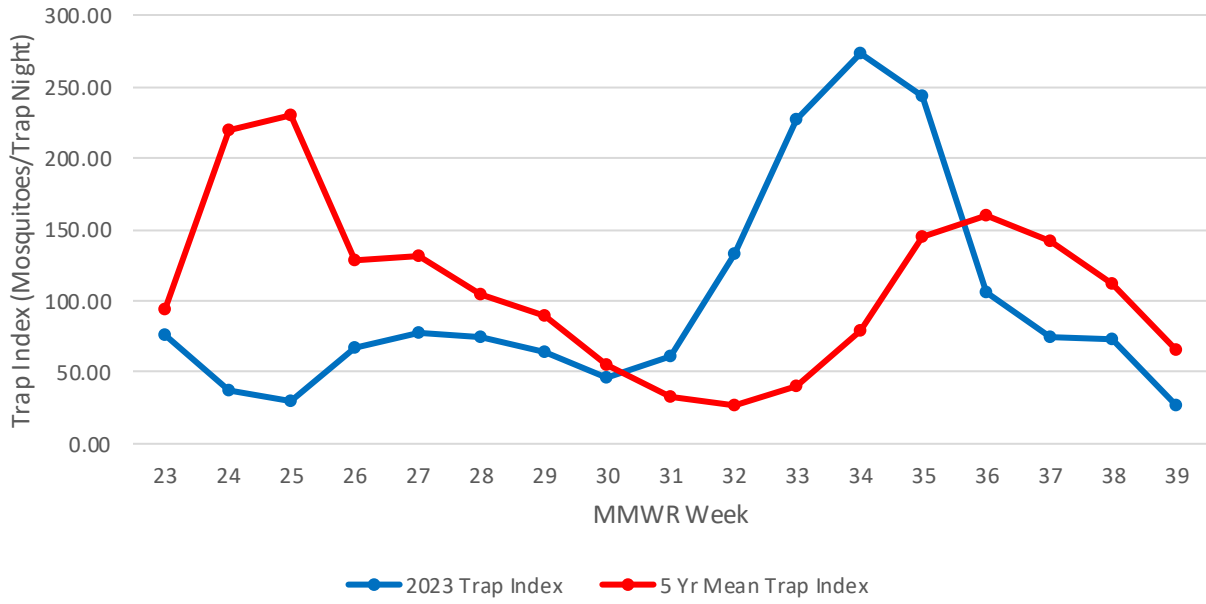
Total Mosquito Trap Index Metro Vector Region, 2023



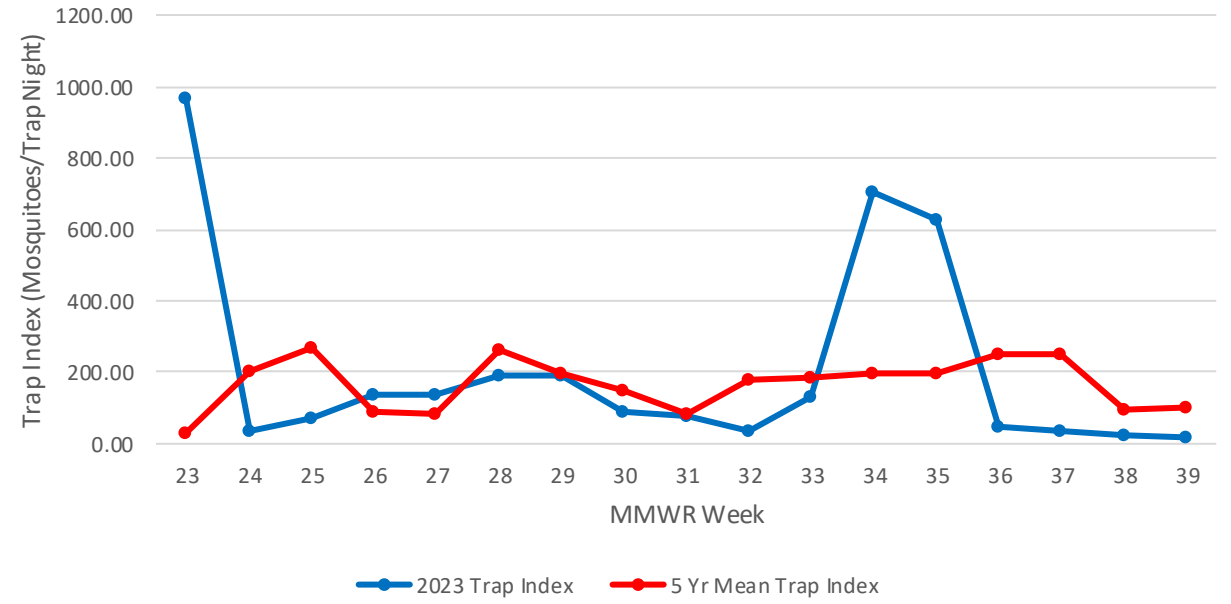
Total Mosquito Trap Index North Vector Region, 2023



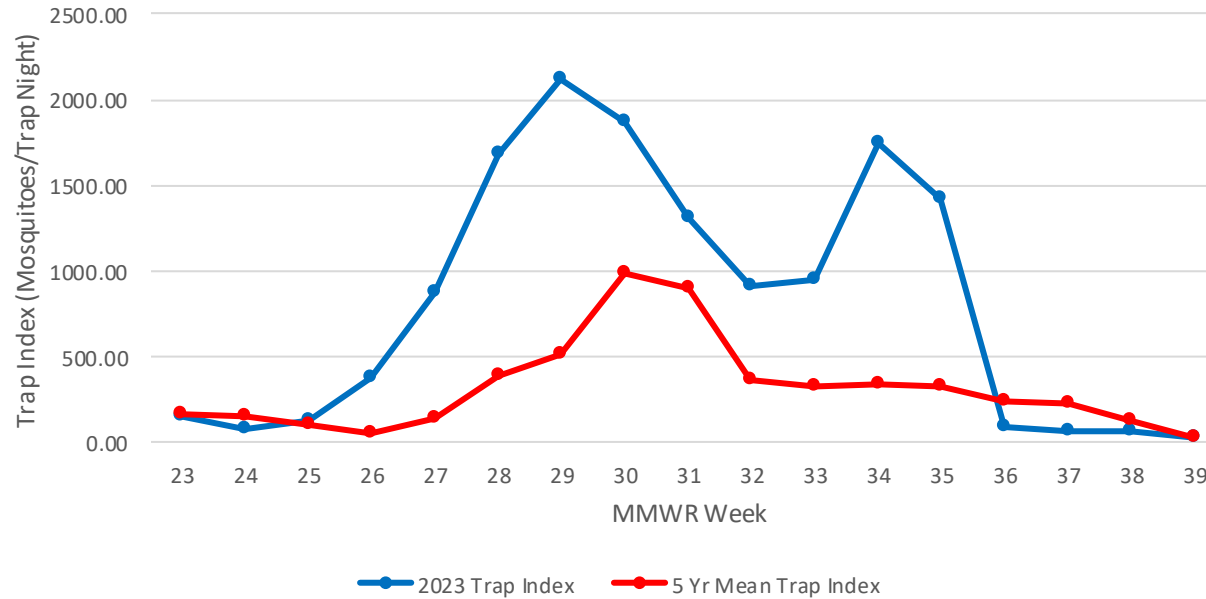
Total Mosquito Trap Index South Central Vector Region, 2023



Total Mosquito Trap Index West Central Vector Region, 2023



Total Mosquito Trap Index Panhandle Vector Region, 2023

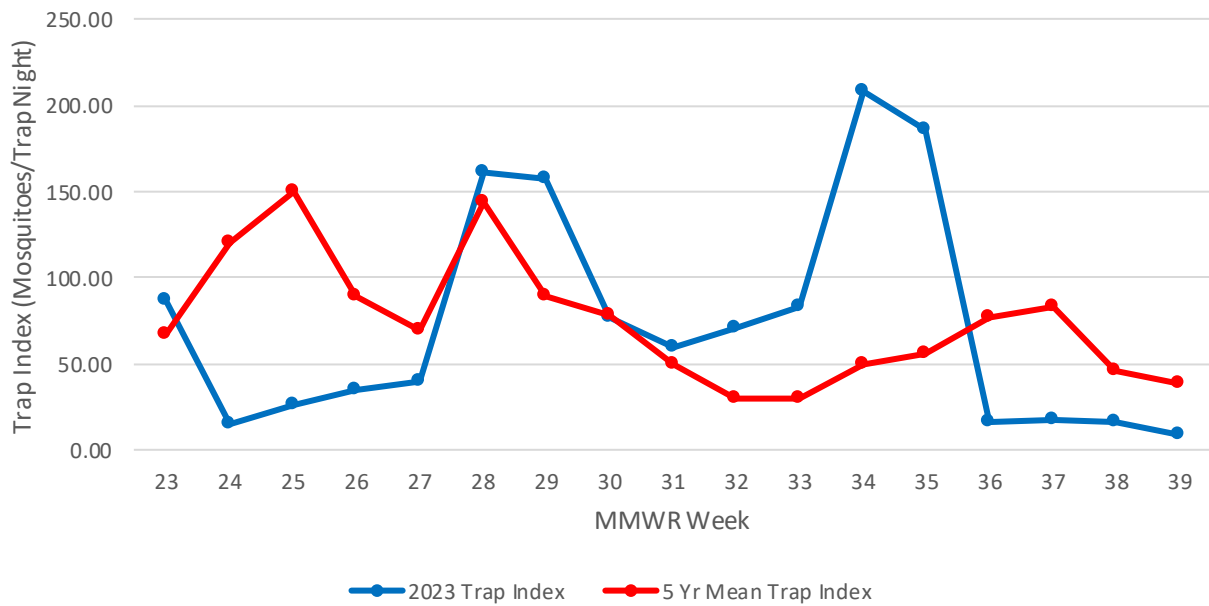




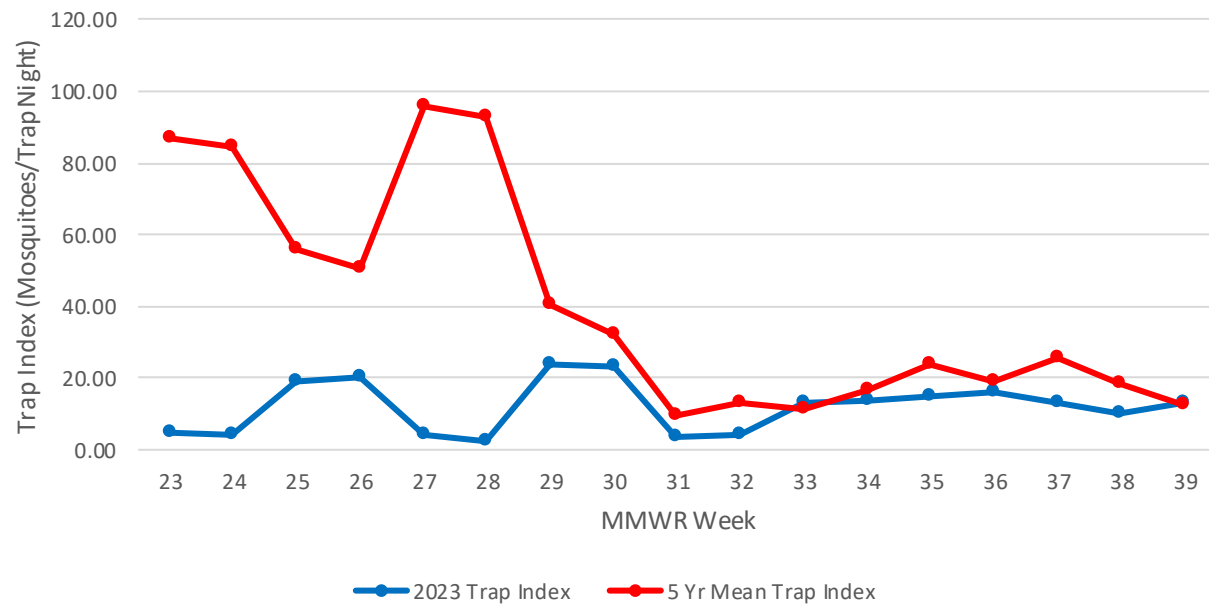
Aedes vexans. Credit: Bugguide.net

SPECIES GRAPHS: *Aedes* SPECIES MOSQUITOES

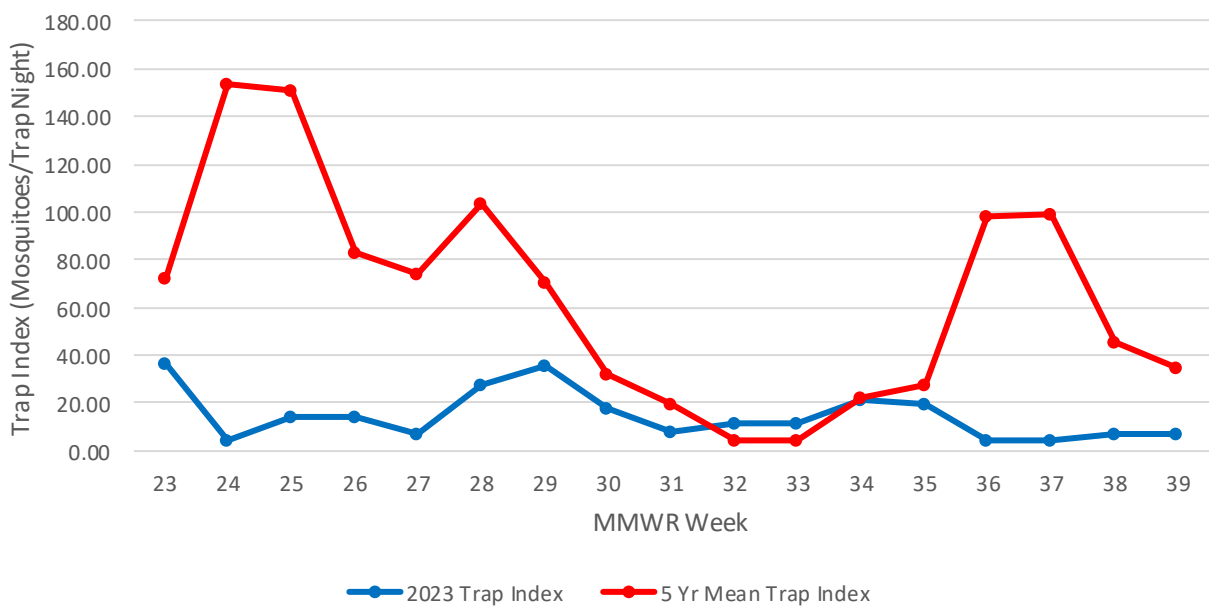
Aedes Mosquito Trap Index Nebraska Statewide, 2023



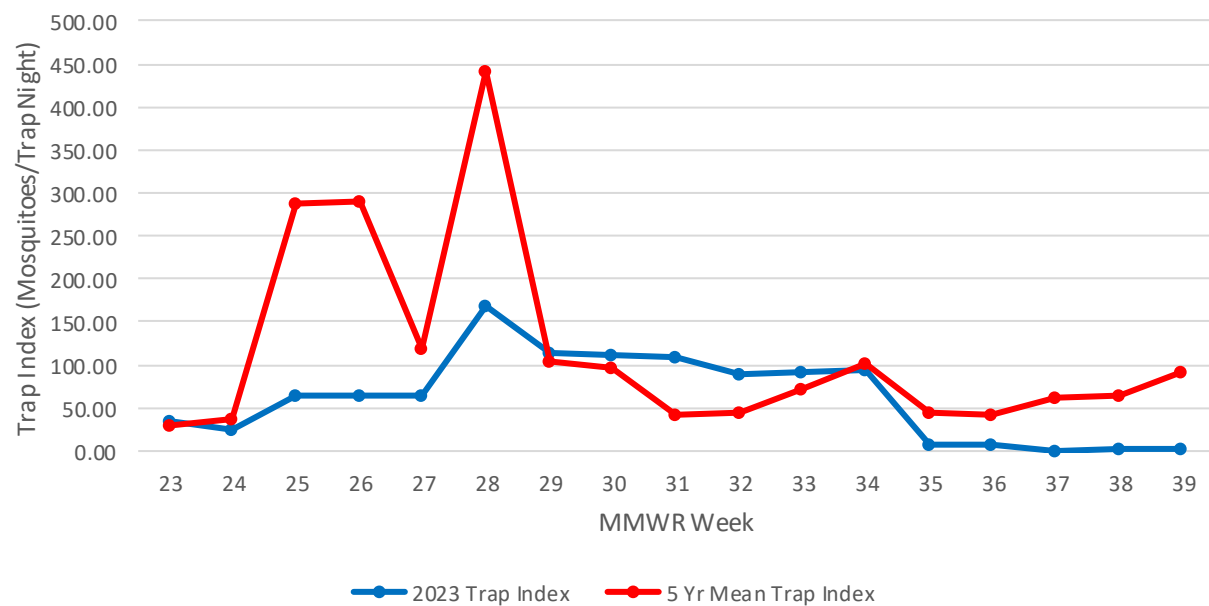
Aedes Mosquito Trap Index Southeast Vector Region, 2023



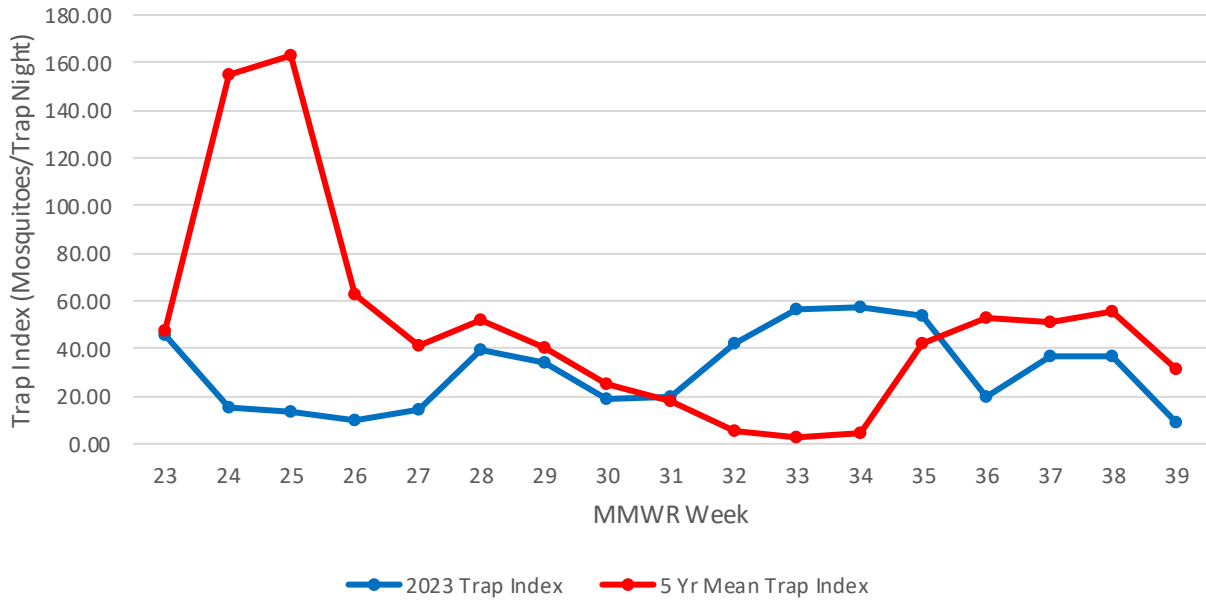
Aedes Mosquito Trap Index Metro Vector Region, 2023



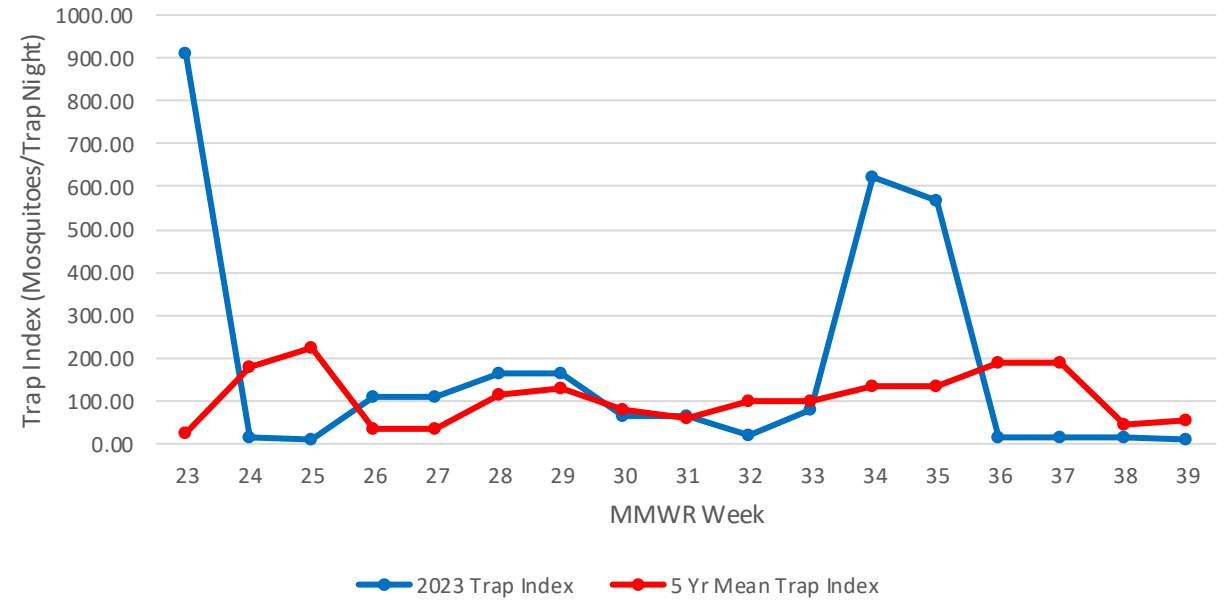
Aedes Mosquito Trap Index North Vector Region, 2023



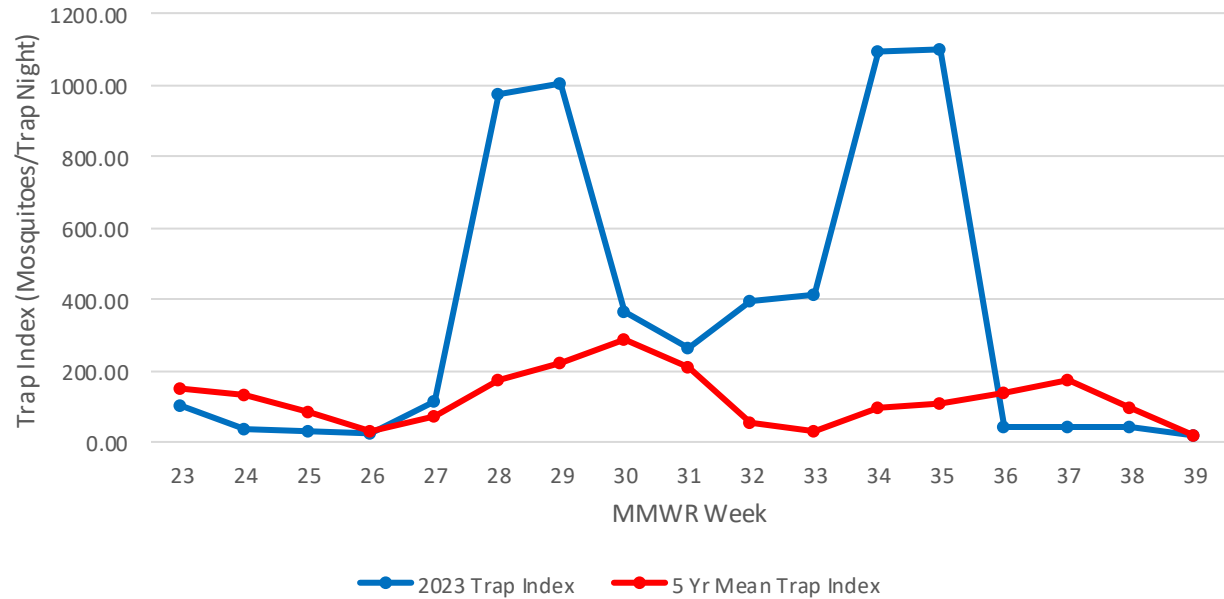
Aedes Mosquito Trap Index South Central Vector Region, 2023



Aedes Mosquito Trap Index West Central Vector Region, 2023



Aedes Mosquito Trap Index Panhandle Vector Region, 2023

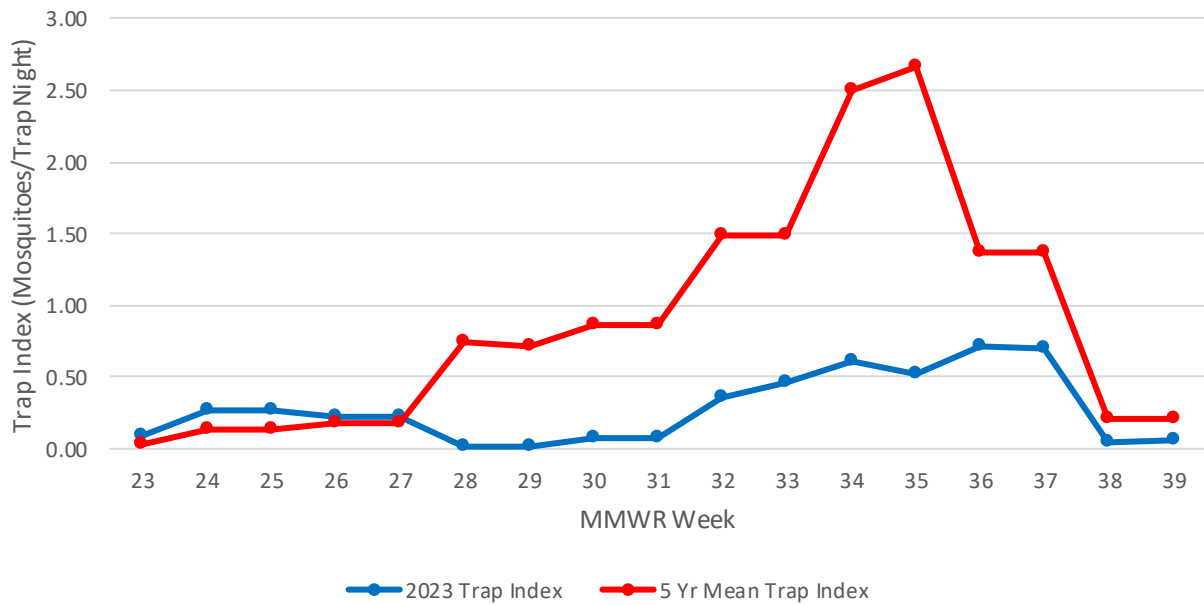




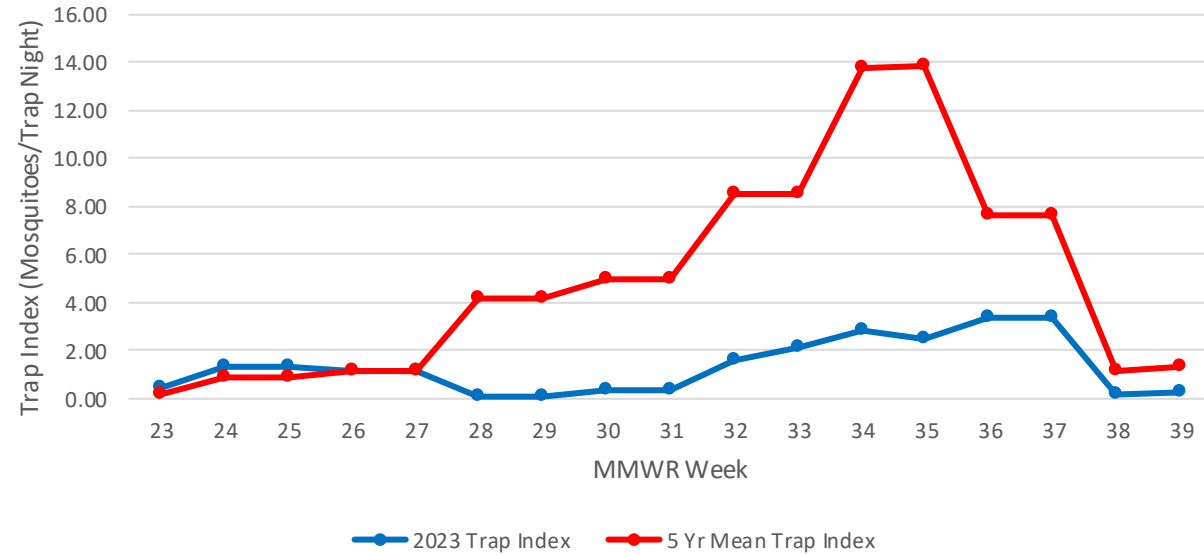
Aedes albopictus. Credit: James Gathany, CDC Public Health Image Library (PHIL)

SPECIES GRAPHS: INVASIVE *Aedes* SPECIES MOSQUITOES

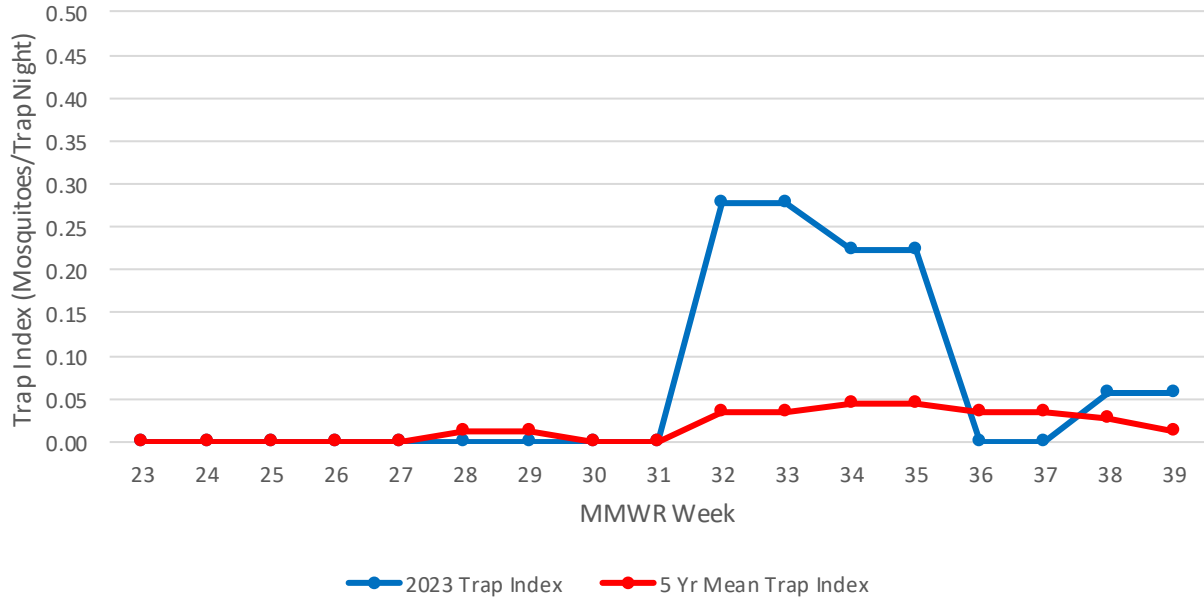
Invasive Aedes Mosquito Trap Index Nebraska Statewide, 2023



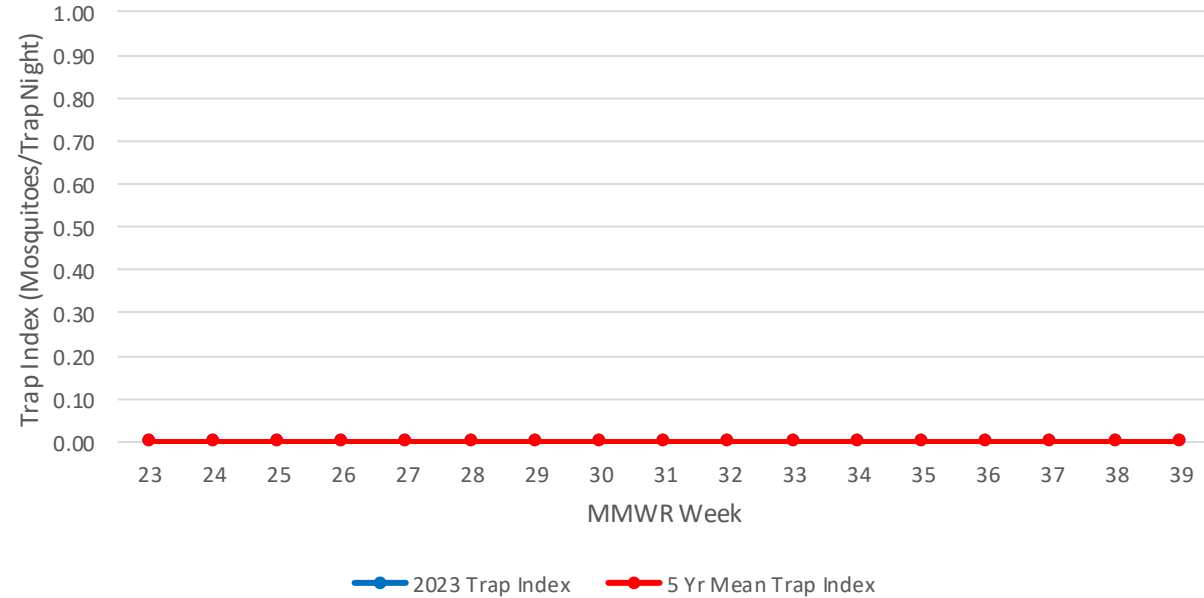
Invasive Aedes Mosquito Trap Index Southeast Vector Region, 2023



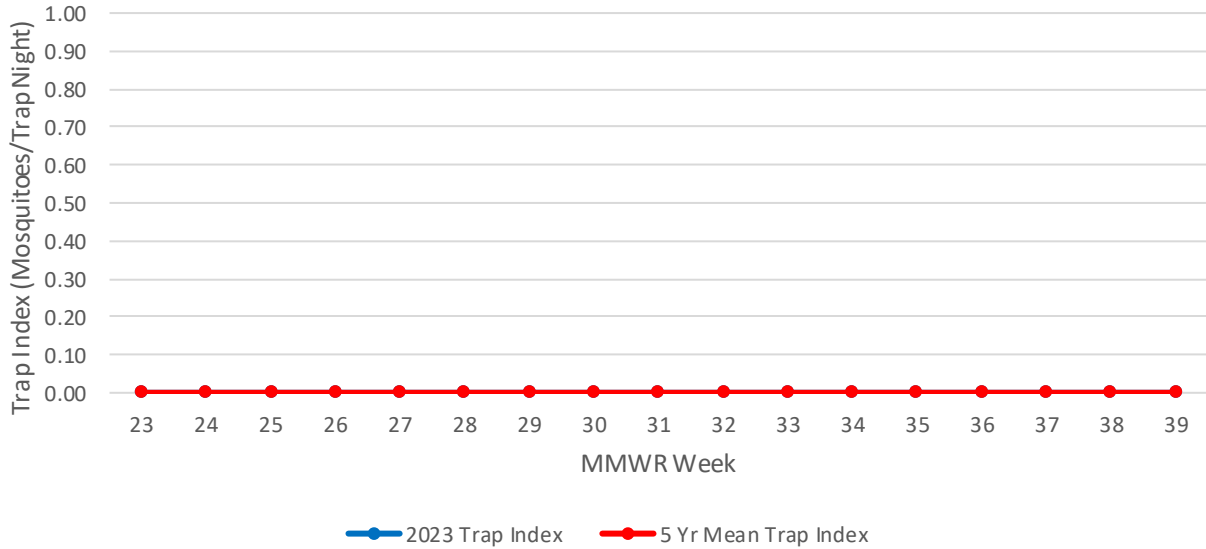
Invasive Aedes Mosquito Trap Index Metro Vector Region, 2023



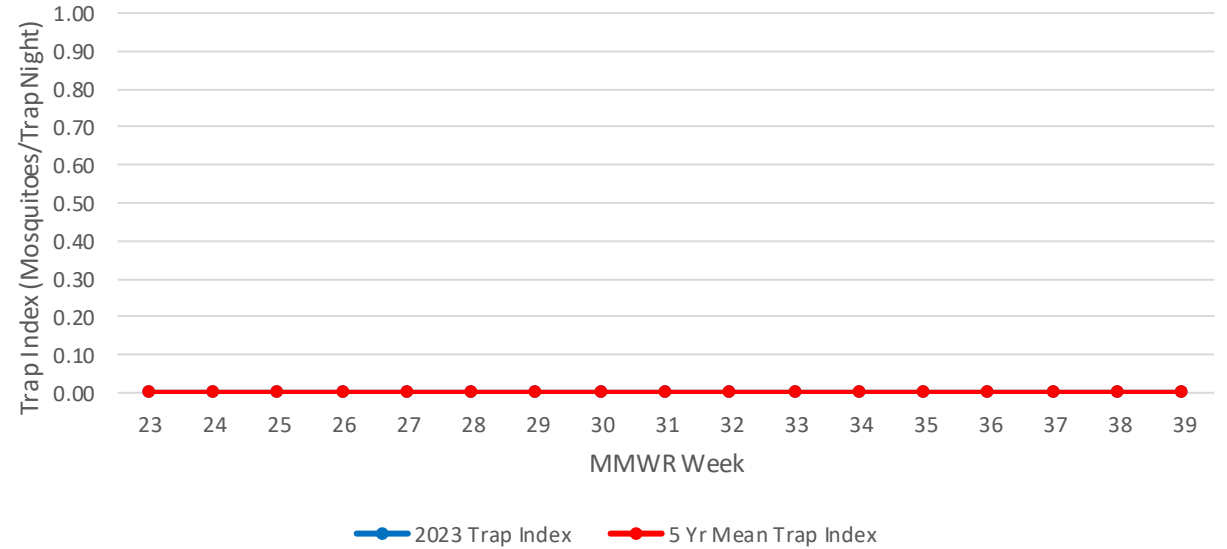
Invasive Aedes Mosquito Trap Index North Vector Region, 2023



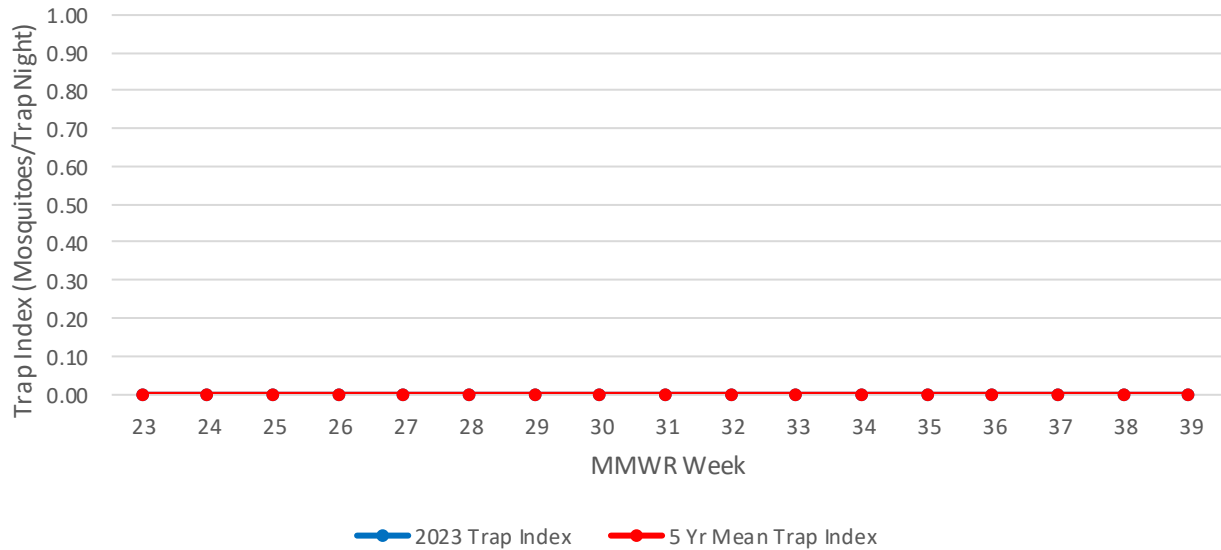
Invasive Aedes Mosquito Trap Index South Central Vector Region, 2023



Invasive Aedes Mosquito Trap Index West Central Vector Region, 2023



Invasive Aedes Mosquito Trap Index Panhandle Vector Region, 2023

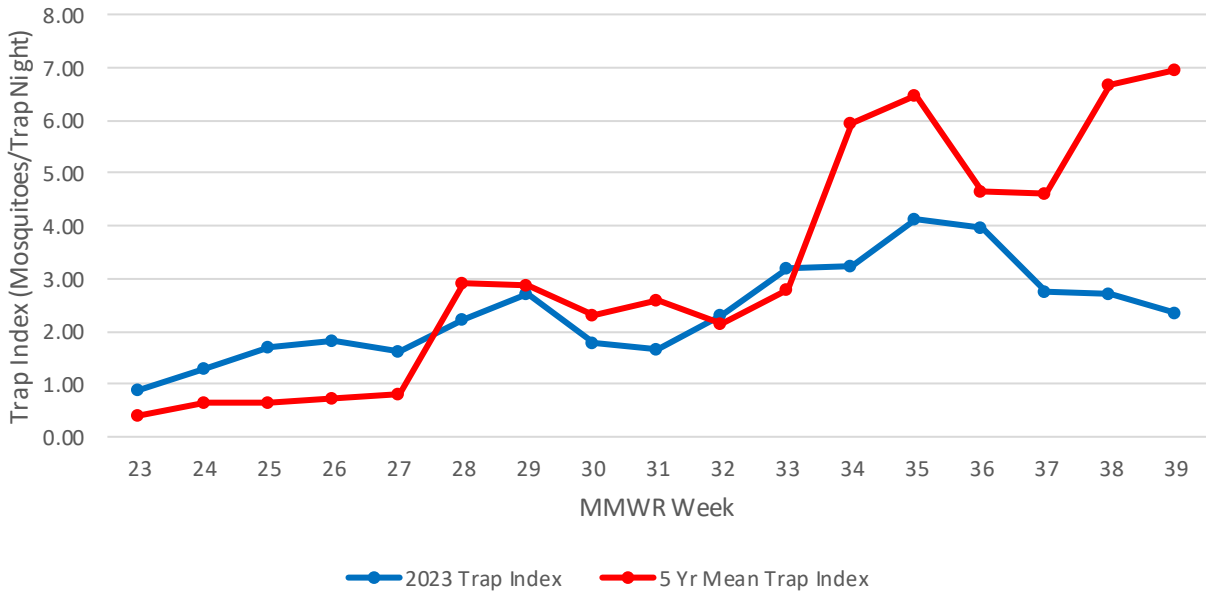




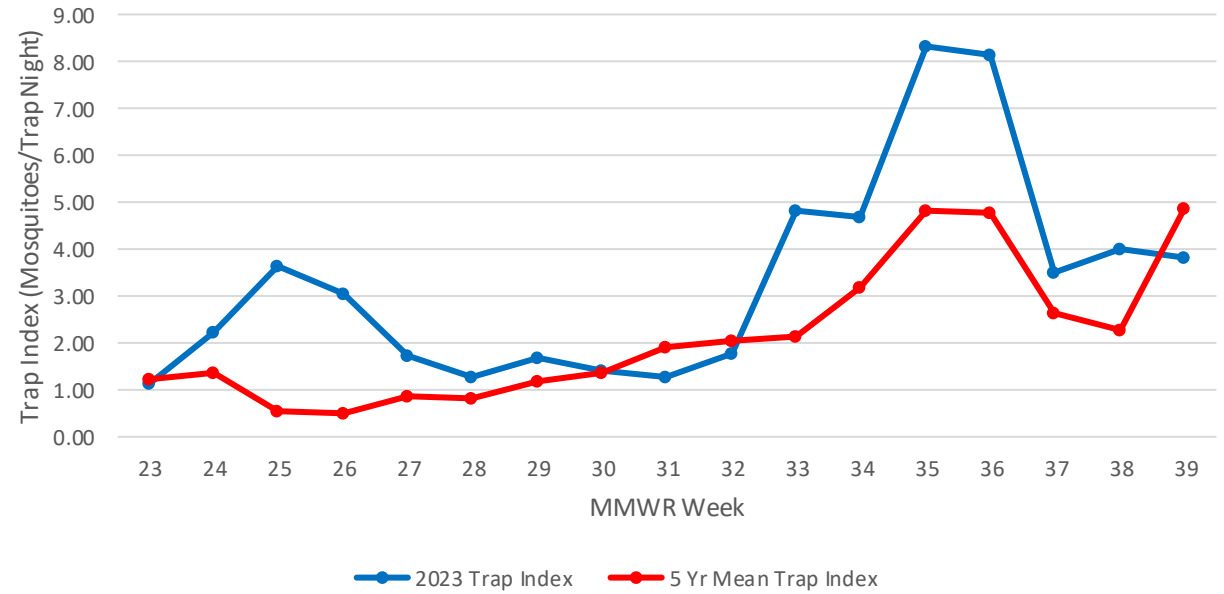
SPECIES GRAPHS: *ANOPHELES* SPECIES MOSQUITOES

Anopheles punctipennis. Credit: Bugguide.net

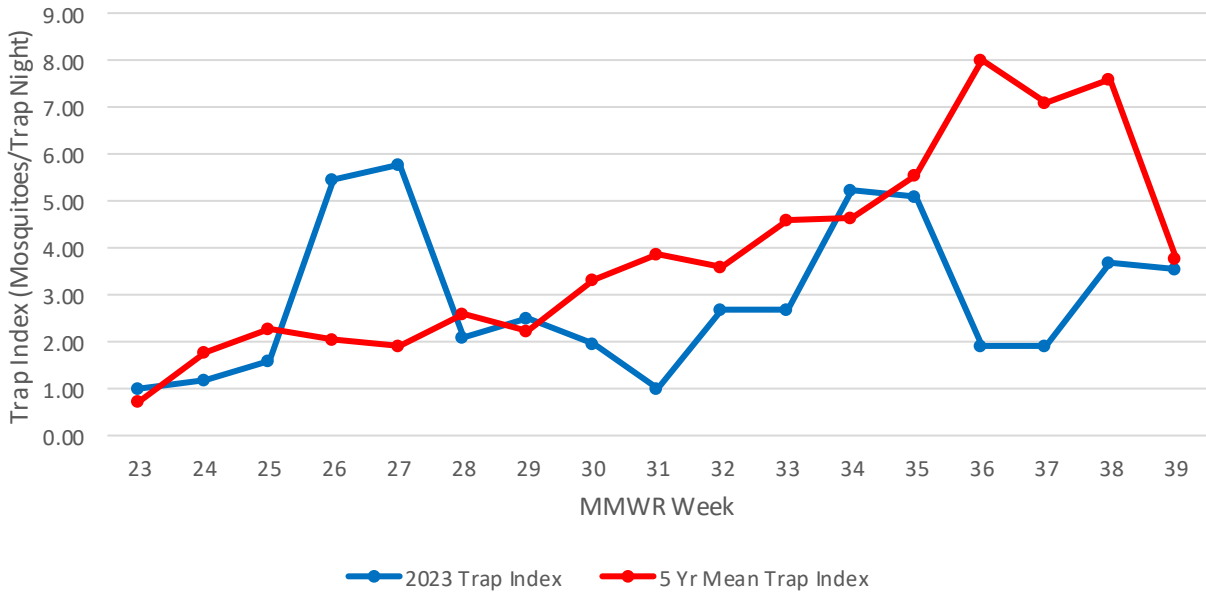
Anopheles Mosquito Trap Index Nebraska Statewide, 2023



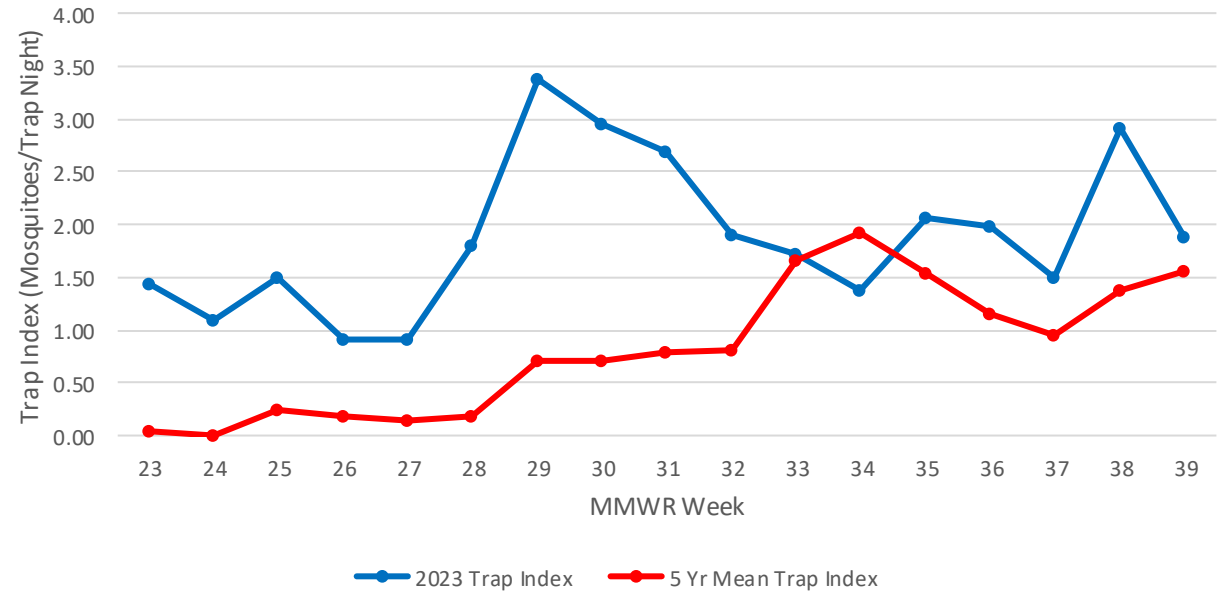
Anopheles Mosquito Trap Index Southeast Vector Region, 2023



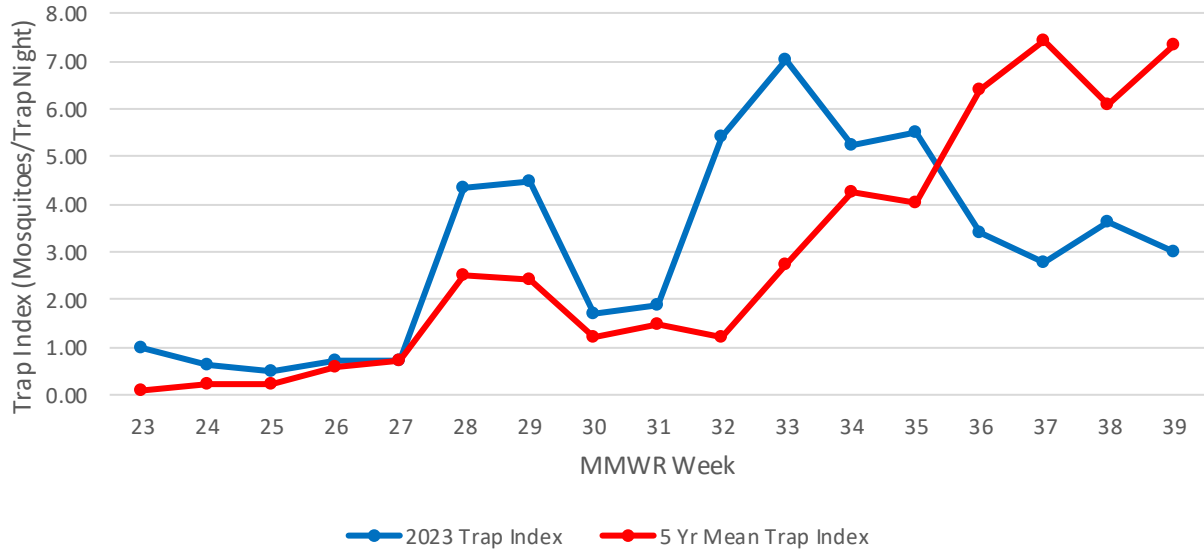
Anopheles Mosquito Trap Index Metro Vector Region, 2023



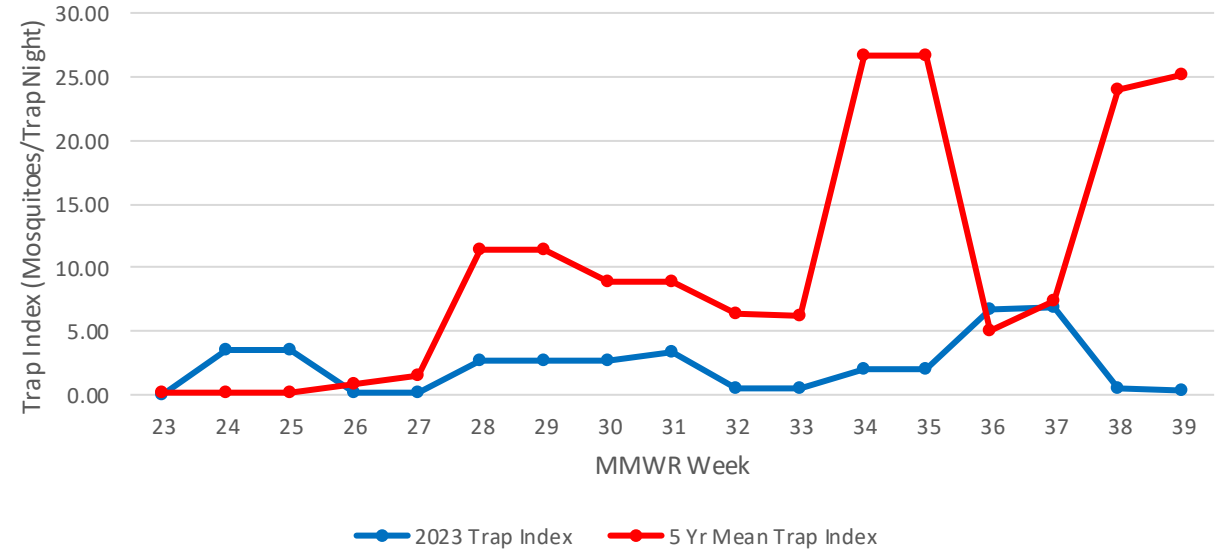
Anopheles Mosquito Trap Index North Vector Region, 2023



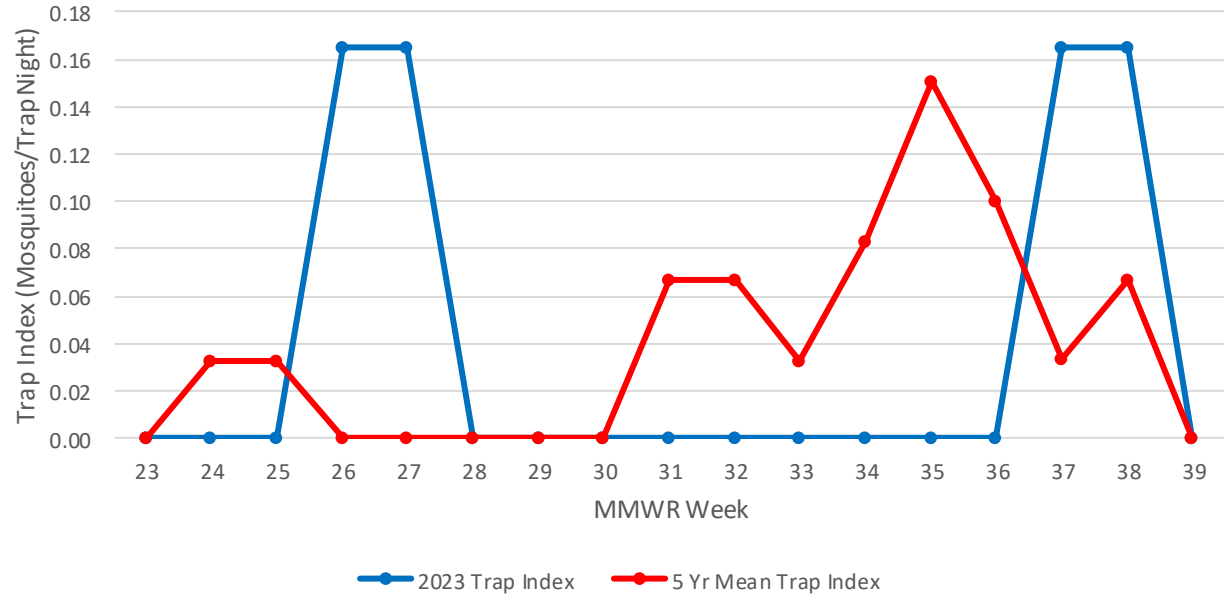
Anopheles Mosquito Trap Index South Central Vector Region, 2023



Anopheles Mosquito Trap Index West Central Vector Region, 2023



Anopheles Mosquito Trap Index Panhandle Vector Region, 2023

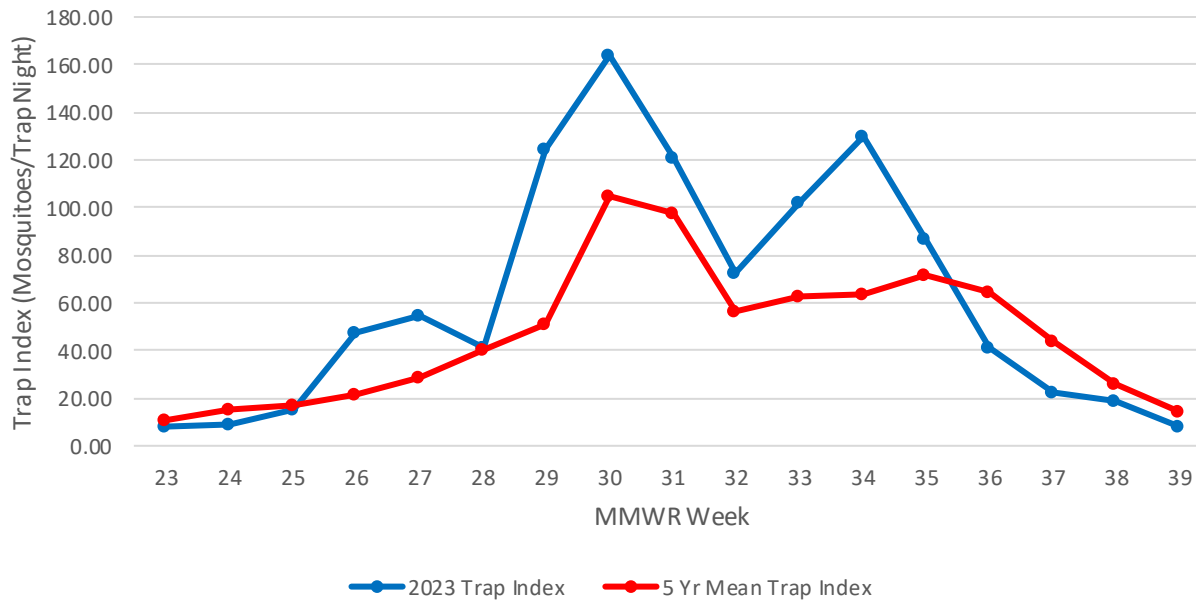




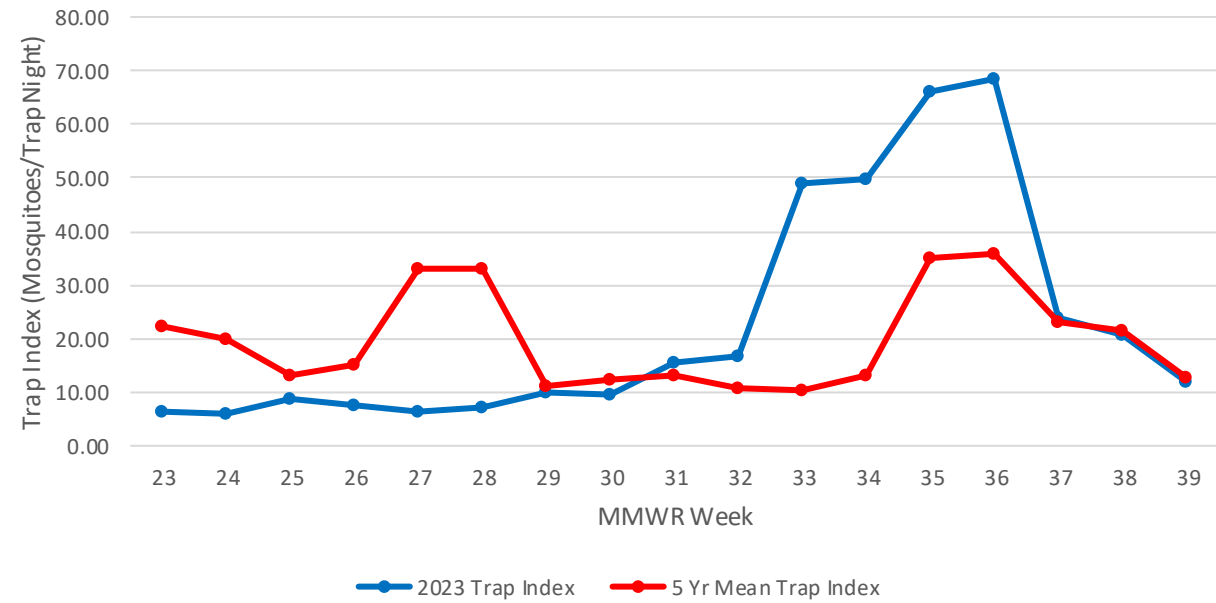
SPECIES GRAPHS: *CULEX* SPECIES MOSQUITOES

Culex tarsalis. Credit: James Gathany, CDC Public Health
Image Library (PHIL)

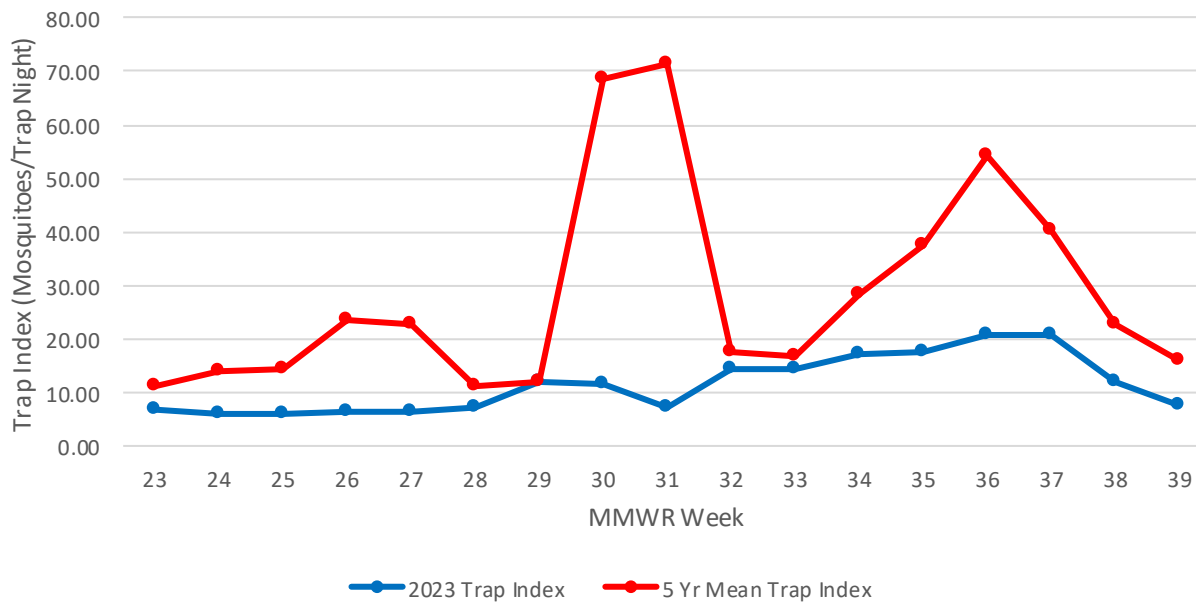
Culex Mosquito Trap Index Nebraska Statewide, 2023



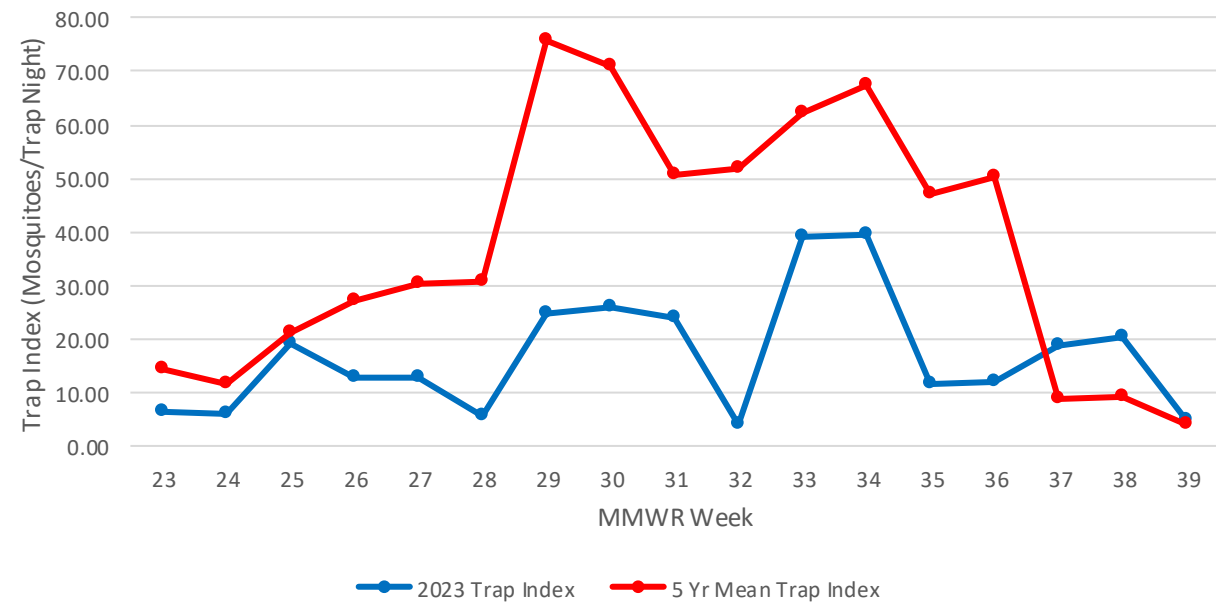
Culex Mosquito Trap Index Southeast Vector Region, 2023



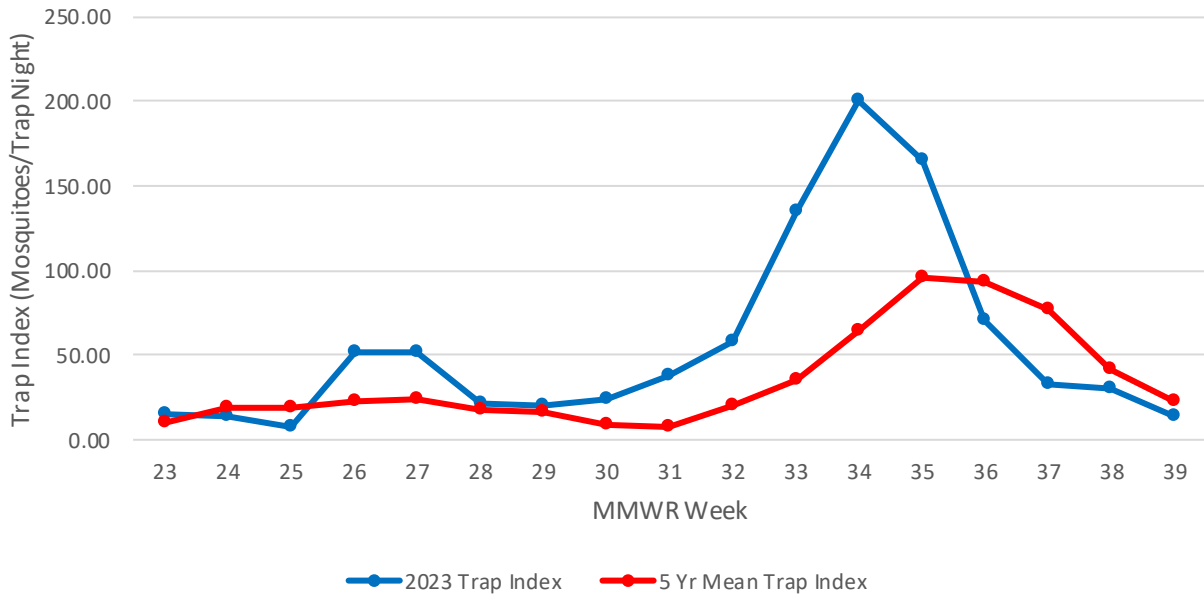
Culex Mosquito Trap Index Metro Vector Region, 2023



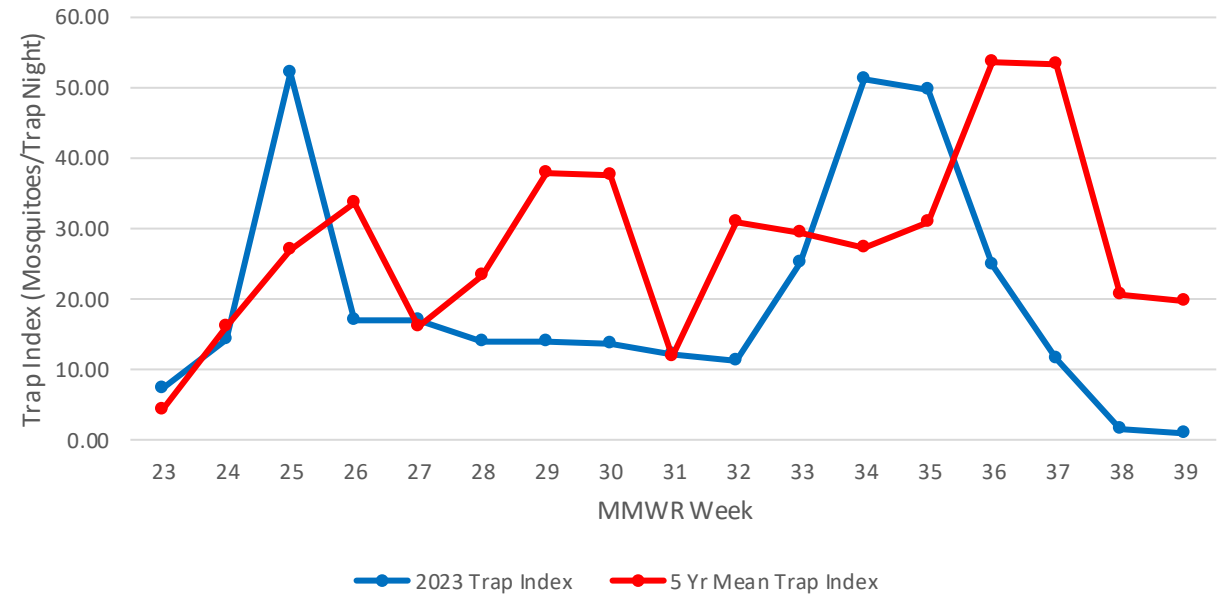
Culex Mosquito Trap Index North Vector Region, 2023



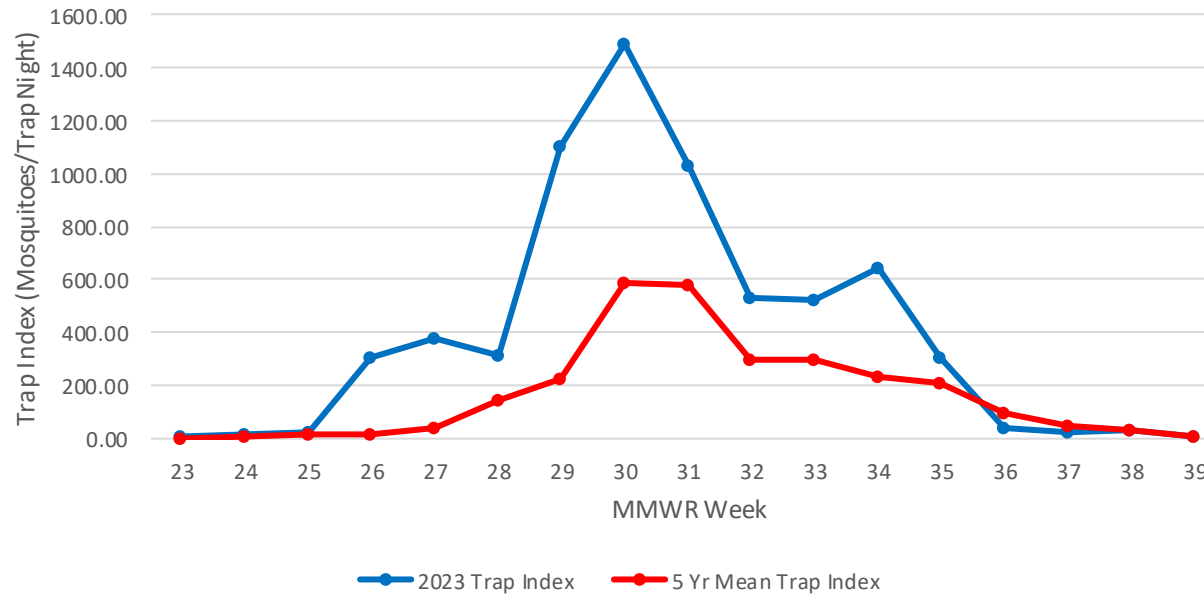
Culex Mosquito Trap Index South Central Vector Region, 2023



Culex Mosquito Trap Index West Central Vector Region, 2023



Culex Mosquito Trap Index Panhandle Vector Region, 2023

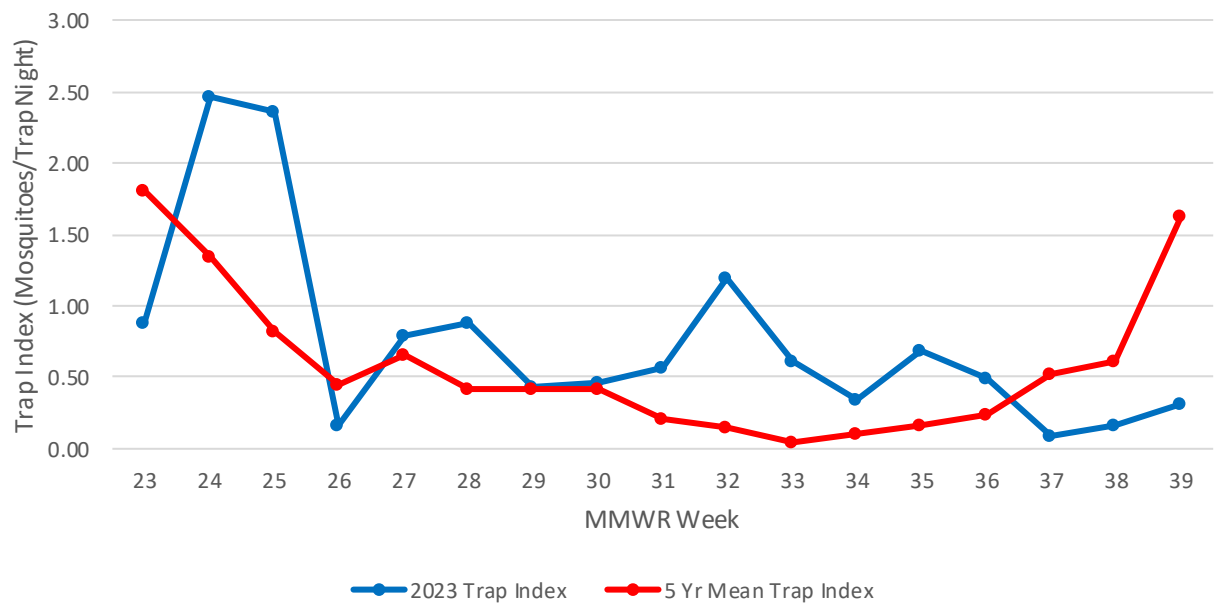




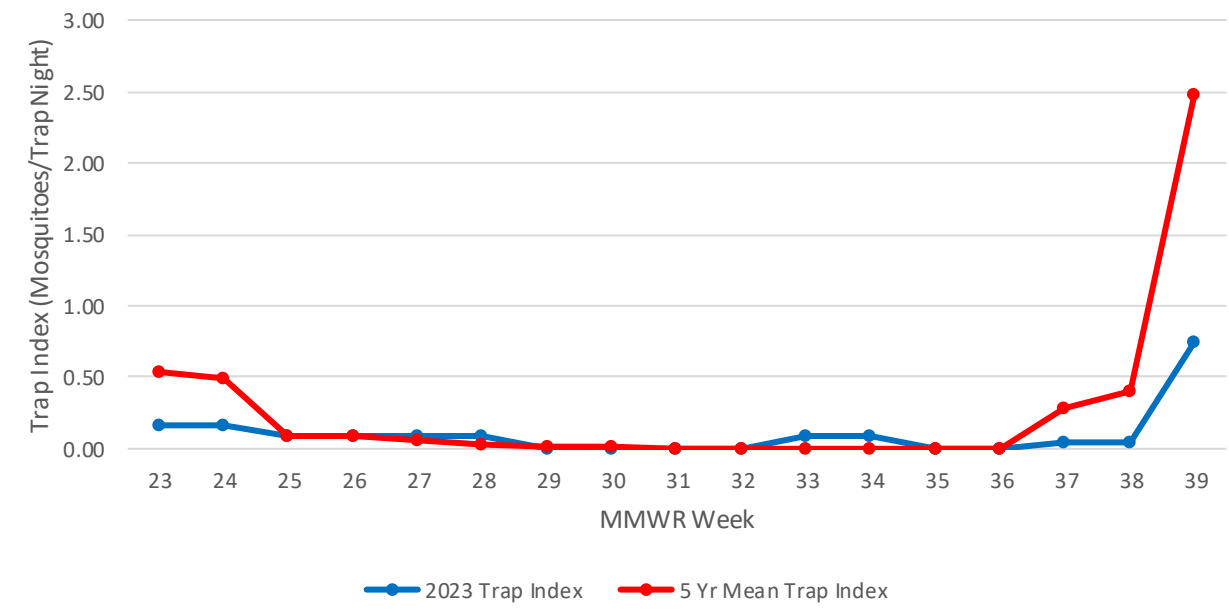
SPECIES GRAPHS: *CULISETA* SPECIES MOSQUITOES

Culiseta inornata. Credit: Wikipedia,
https://en.wikipedia.org/wiki/Culiseta_inornata#/media/File:Culiseta_inornata_P1560226a.jpg

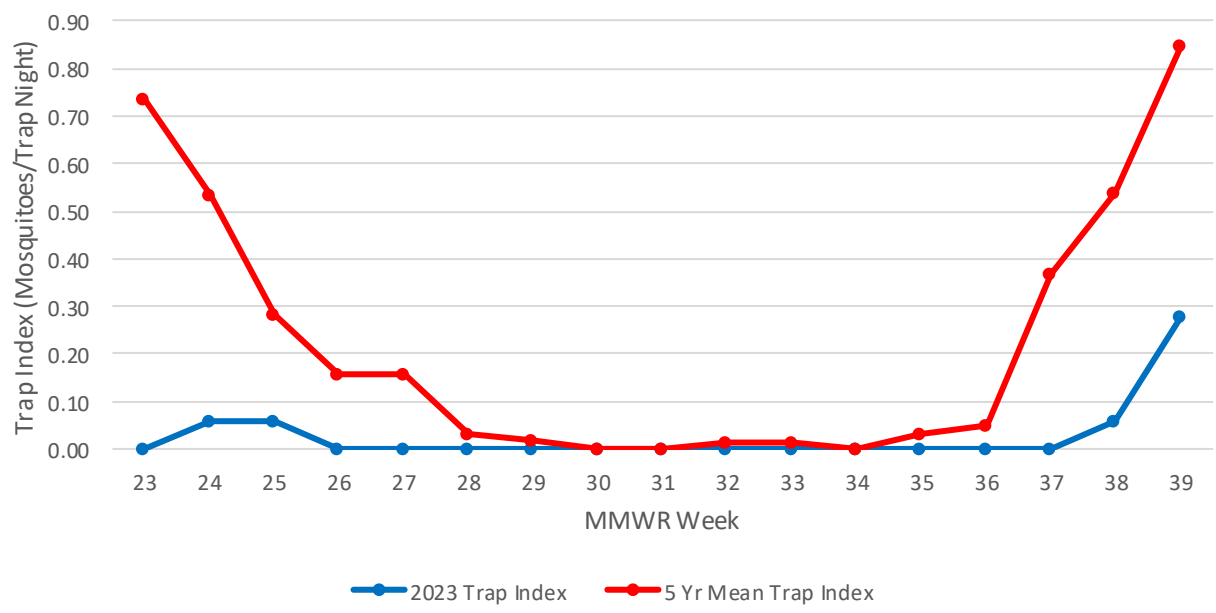
Culiseta Mosquito Trap Index Nebraska Statewide, 2023



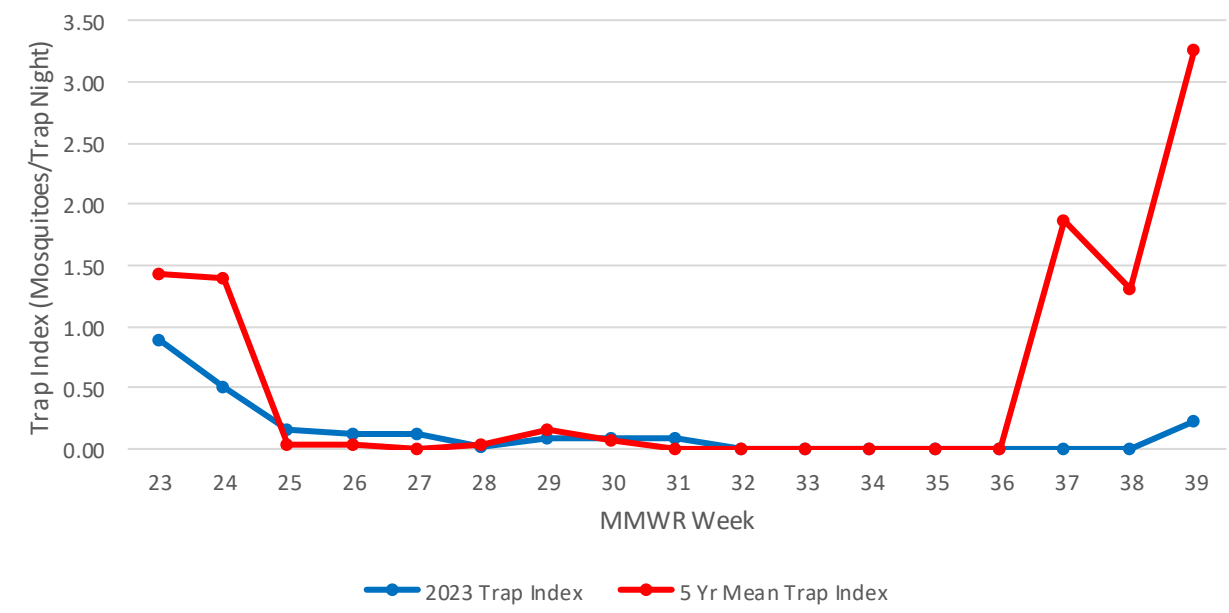
Culiseta Mosquito Trap Index Southeast Vector Region, 2023



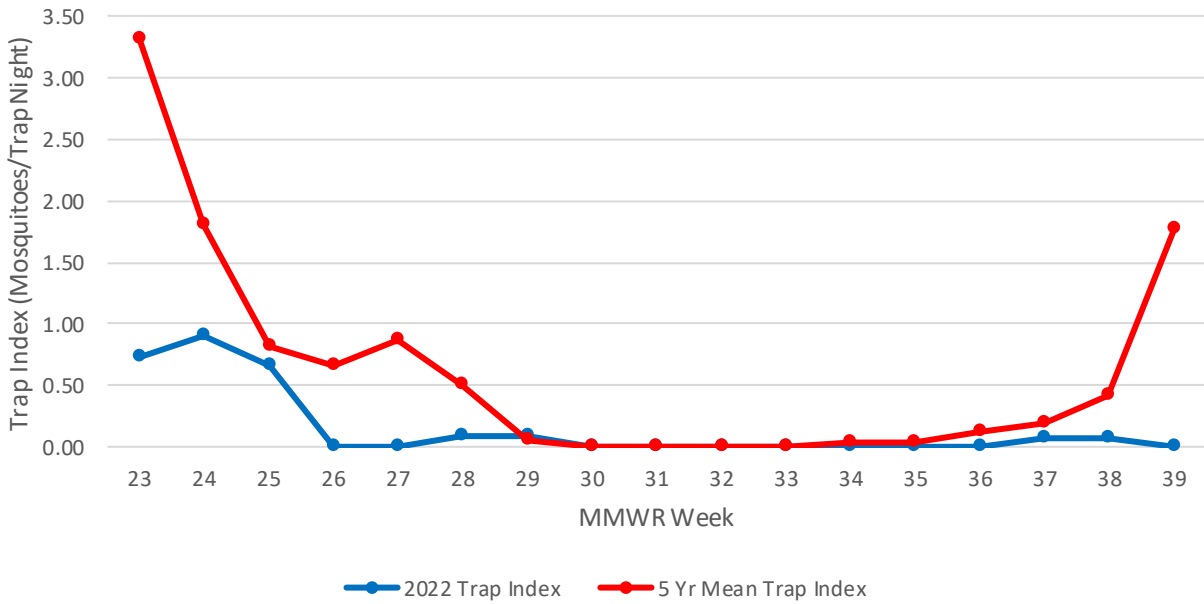
Culiseta Mosquito Trap Index Metro Vector Region, 2023



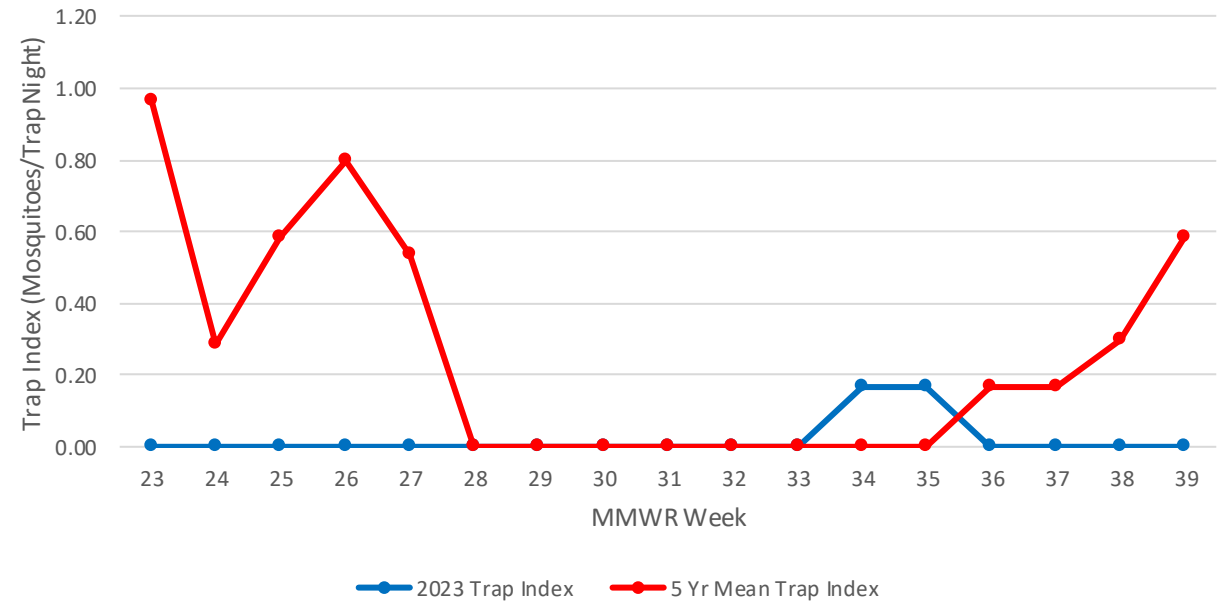
Culiseta Mosquito Trap Index North Vector Region, 2023



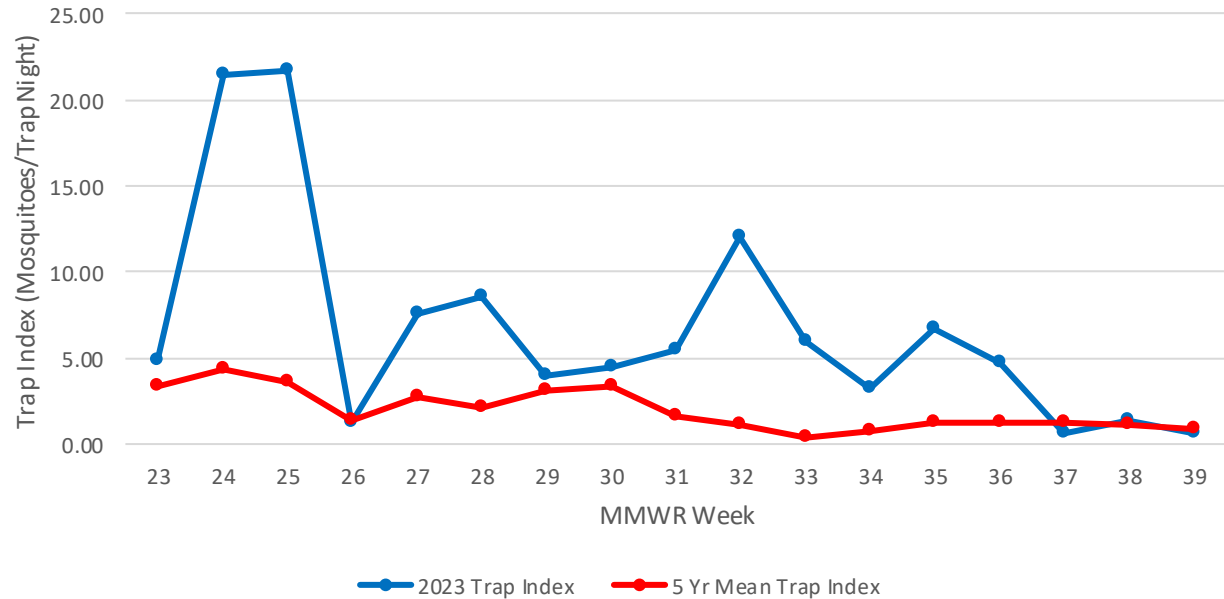
Culiseta Mosquito Trap Index South Central Vector Region, 2023



Culiseta Mosquito Trap Index West Central Vector Region, 2023



Culiseta Mosquito Trap Index Panhandle Vector Region, 2023



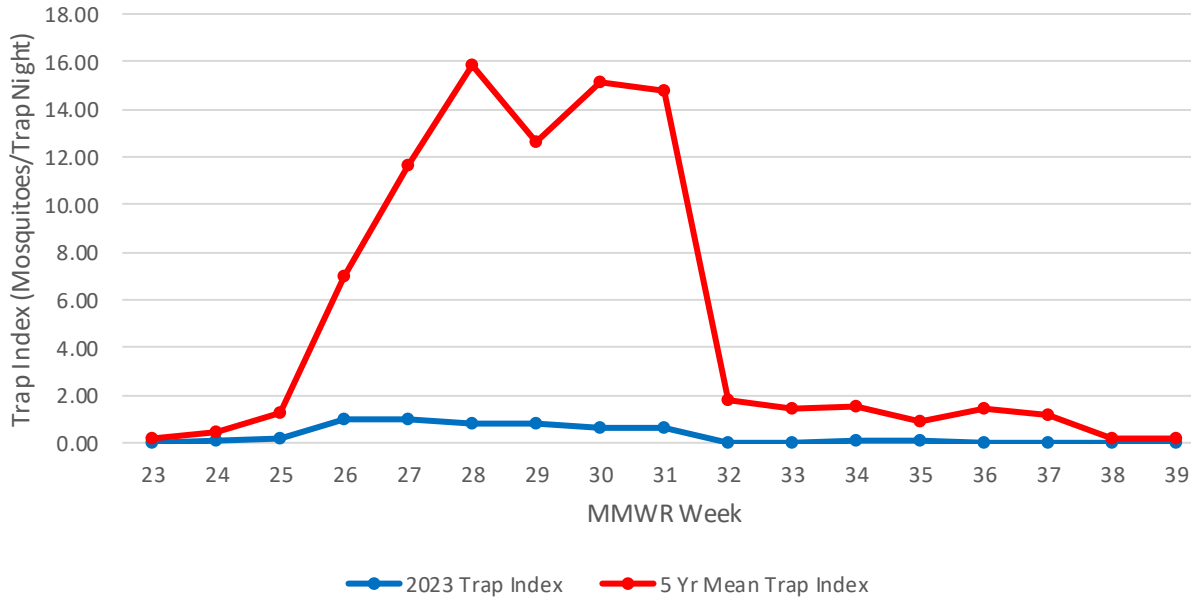


SPECIES GRAPHS: COQUILLETIDIA PERTURBANS MOSQUITOES

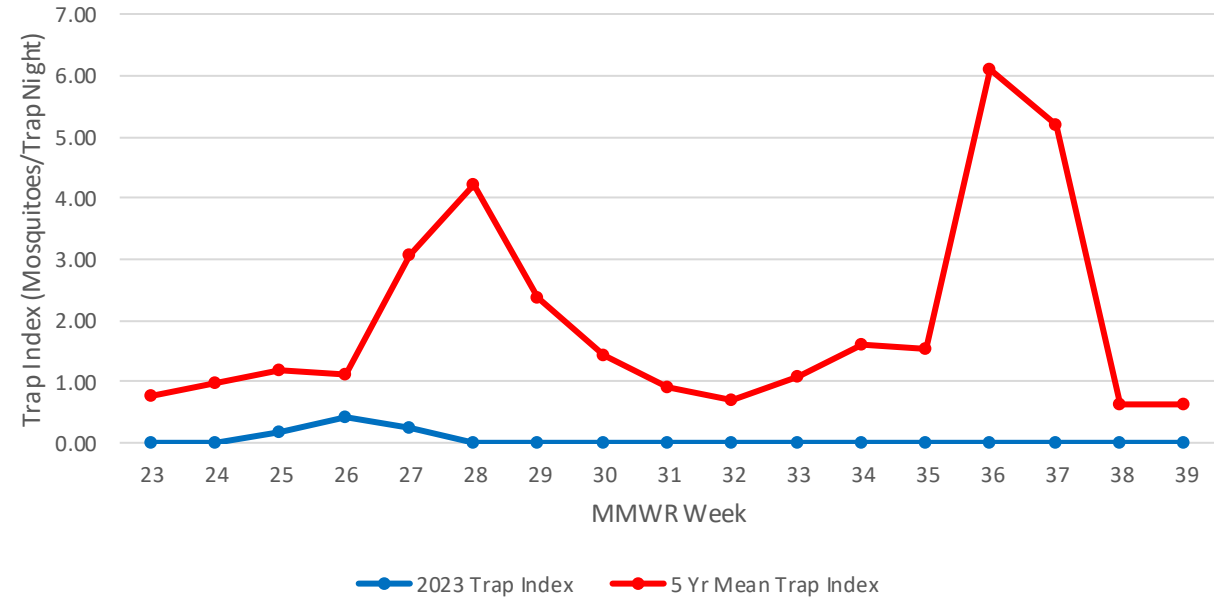
Coquillettidia perturbans. Credit: Johnson, Cuda, and Burkett-Cadena 2017, Featured Creatures, University of Florida, Entomology and Nematology, Florida Department of Agriculture and Consumer Services

https://entnemdept.ufl.edu/creatures/aquatic/Coquillettidia_perturbans.htm

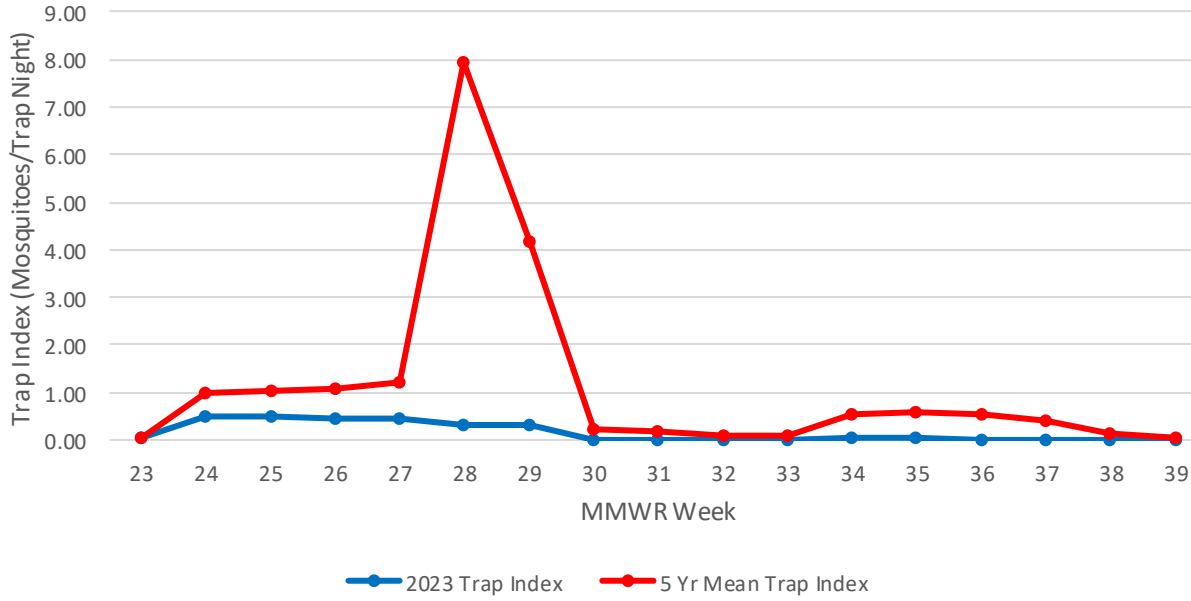
Coquilletidia Mosquito Trap Index Nebraska Statewide, 2023



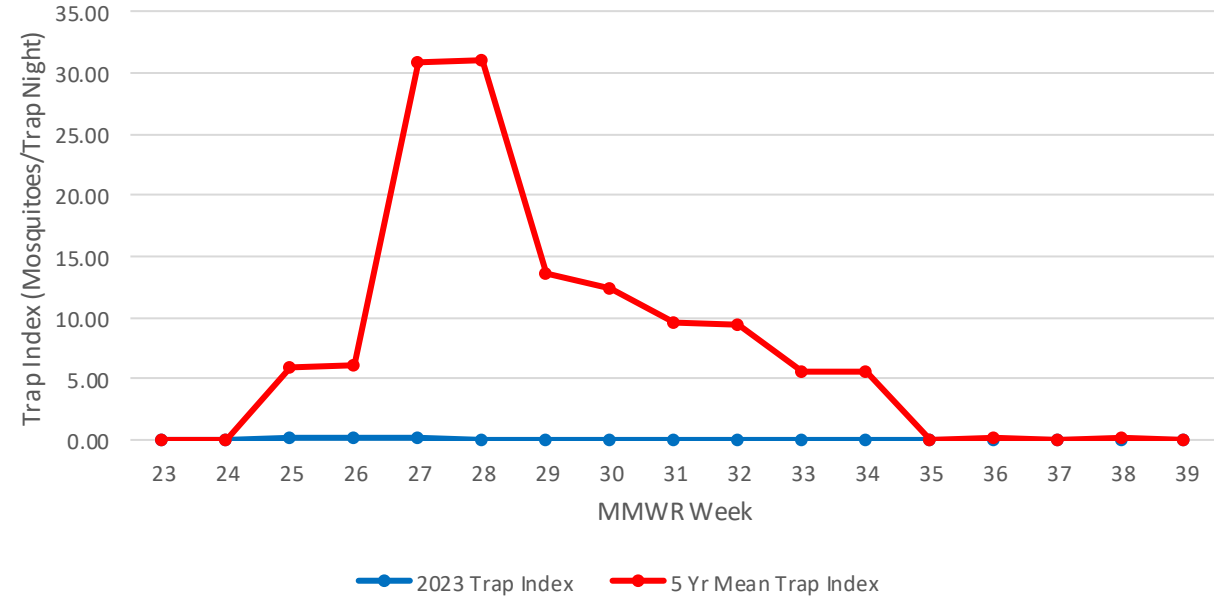
Coquilletidia Mosquito Trap Index Southeast Vector Region, 2023



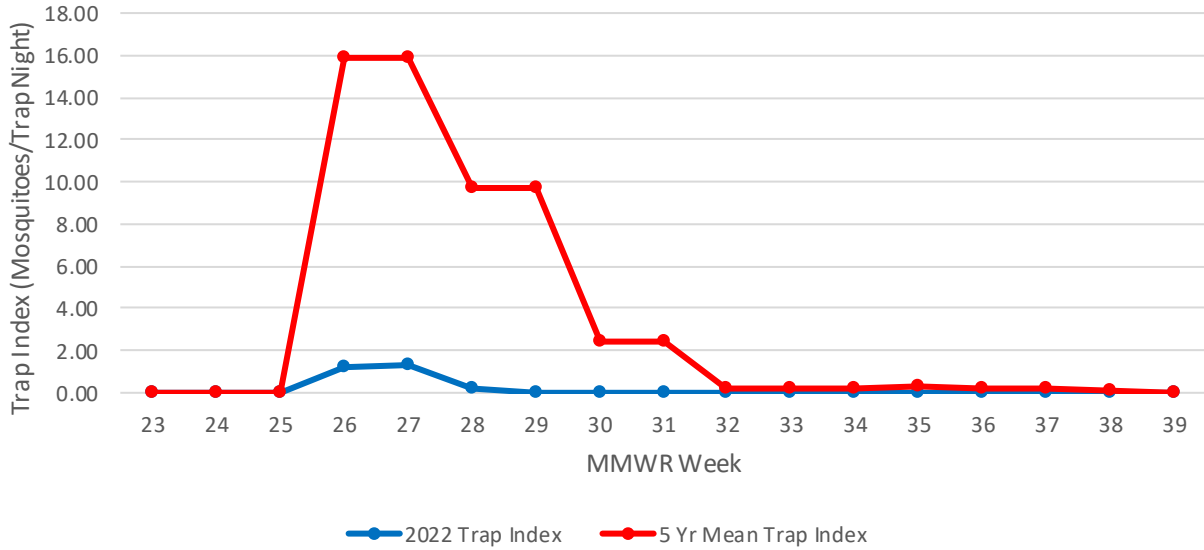
Coquilletidia Mosquito Trap Index Metro Vector Region, 2023



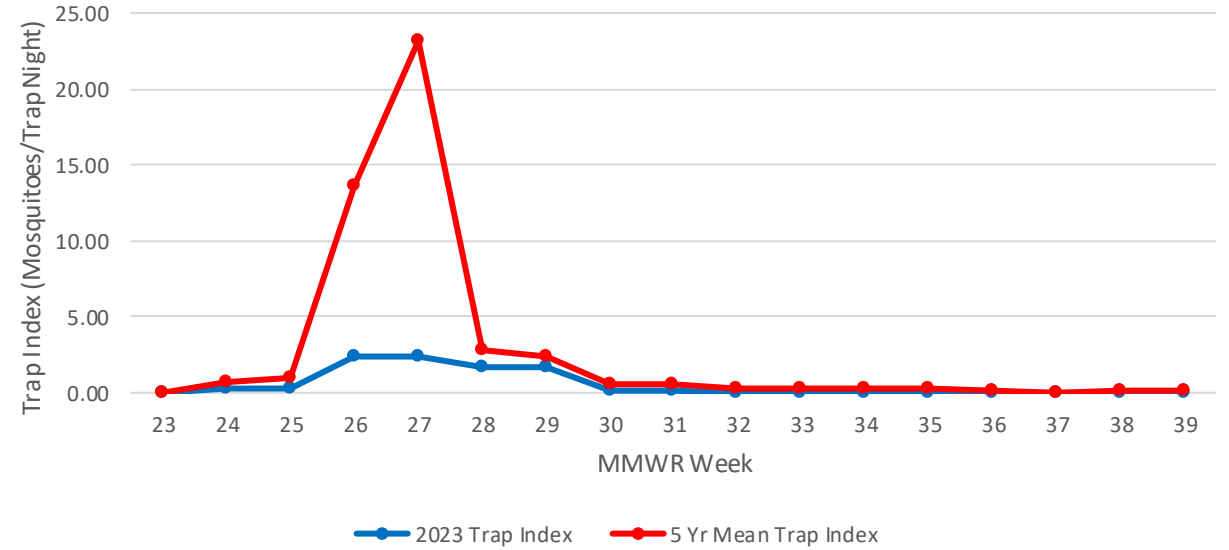
Coquilletidia Mosquito Trap Index North Vector Region, 2023



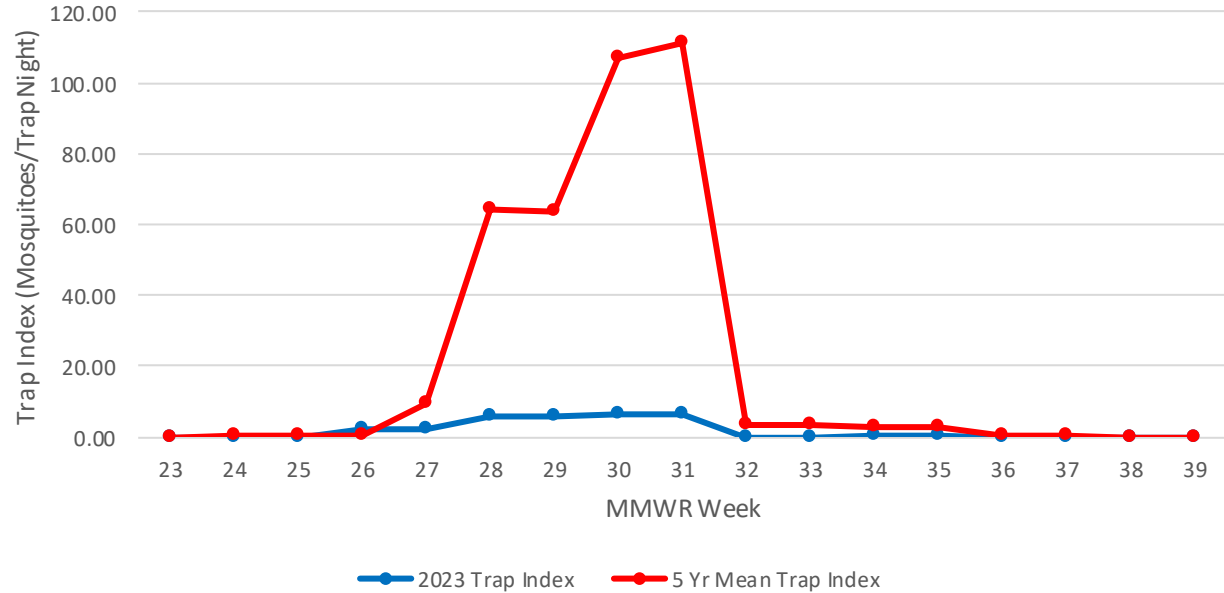
Coquilletidia Mosquito Trap Index South Central Vector Region, 2023



Coquilletidia Mosquito Trap Index West Central Vector Region, 2023



Coquilletidia Mosquito Trap Index Panhandle Vector Region, 2023



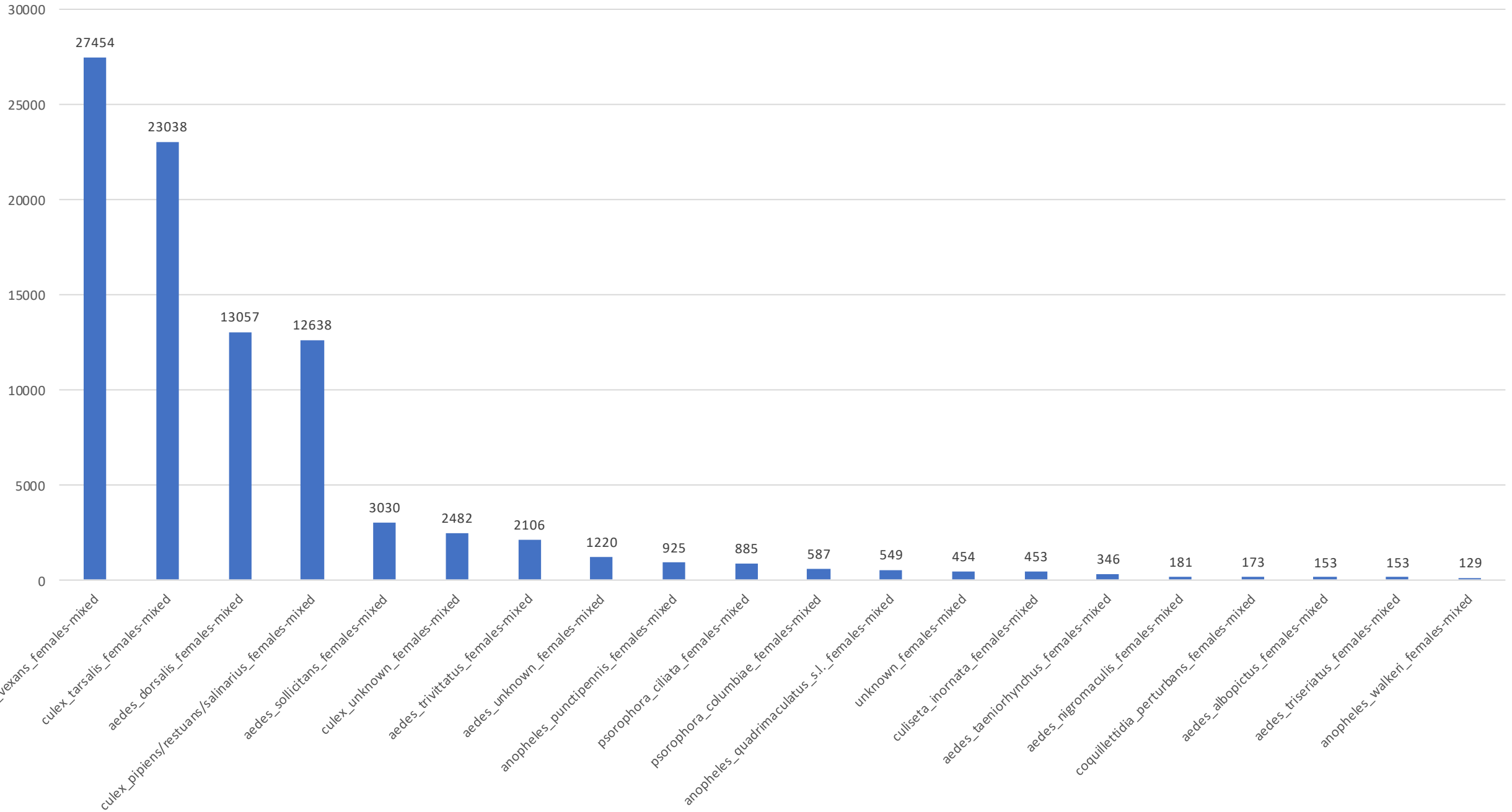


TOP MOSQUITOES PER REGION GRAPHS (CUMULATIVE COUNTS)

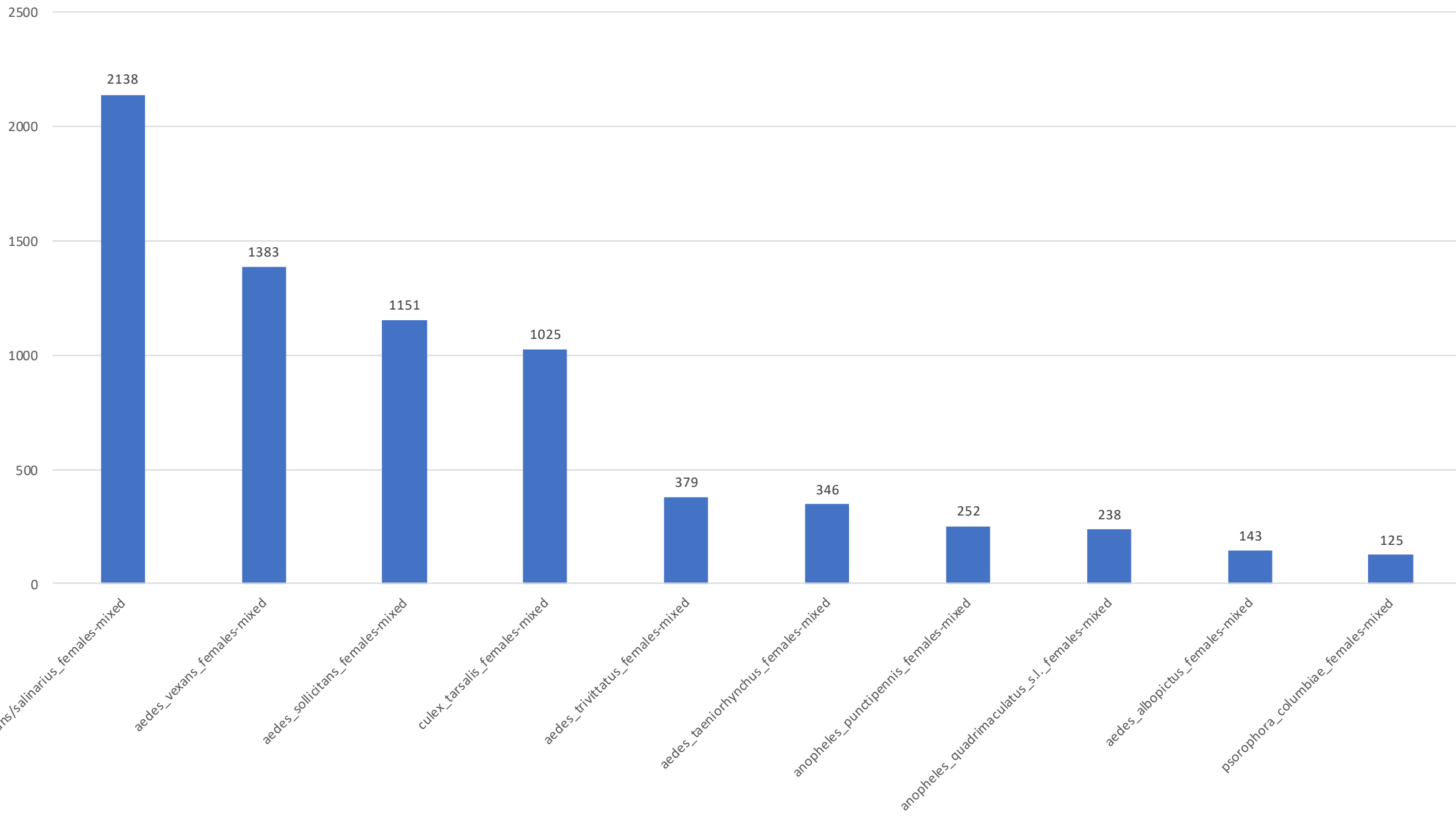
Psorophora ciliata. Credit: Regasa and Kaufman 2018,
Featured Creatures, University of Florida, Entomology
and Nematology, Florida Department of Agriculture and
Consumer Services

[https://entnemdept.ufl.edu/creatures/AQUATIC/Ps_cilia
ta.htm](https://entnemdept.ufl.edu/creatures/AQUATIC/Ps_ciliata.htm)

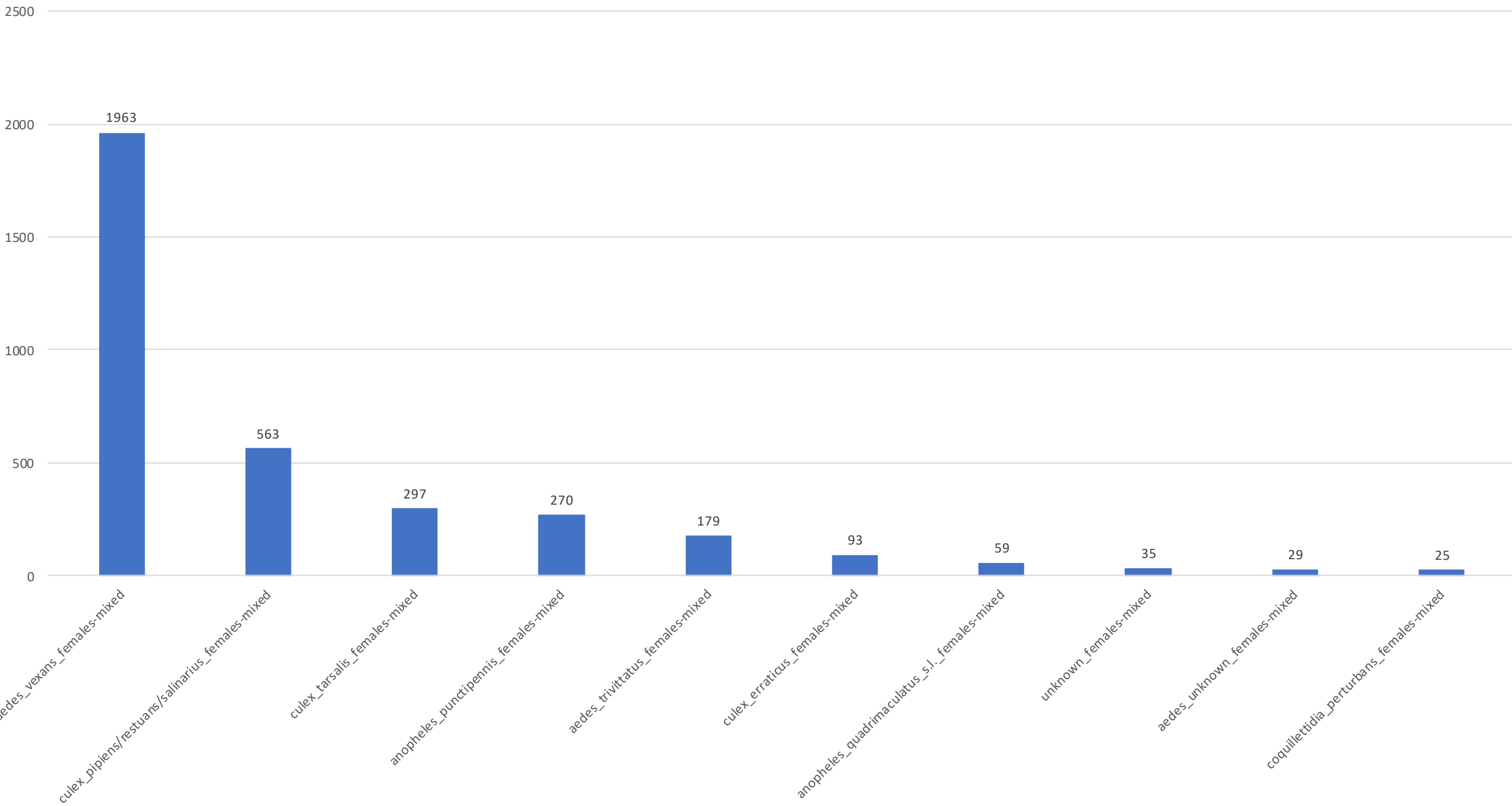
Top 20 Mosquito Species Collected During Mosquito Surveillance Nebraska, 2023



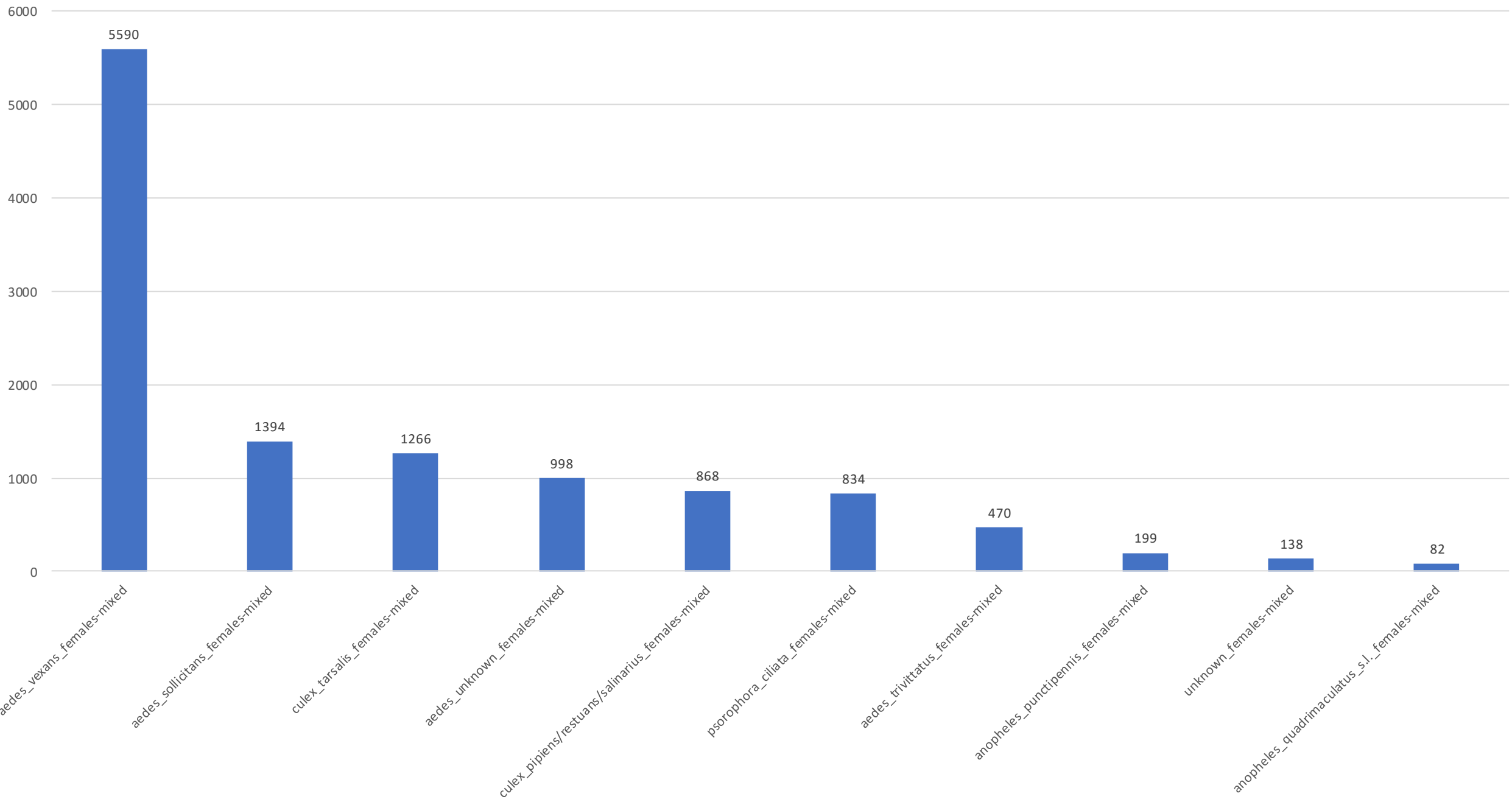
Top 10 Mosquitoes Collected During Mosquito Surveillance, Southeast Vector Surveillance Region, 2023



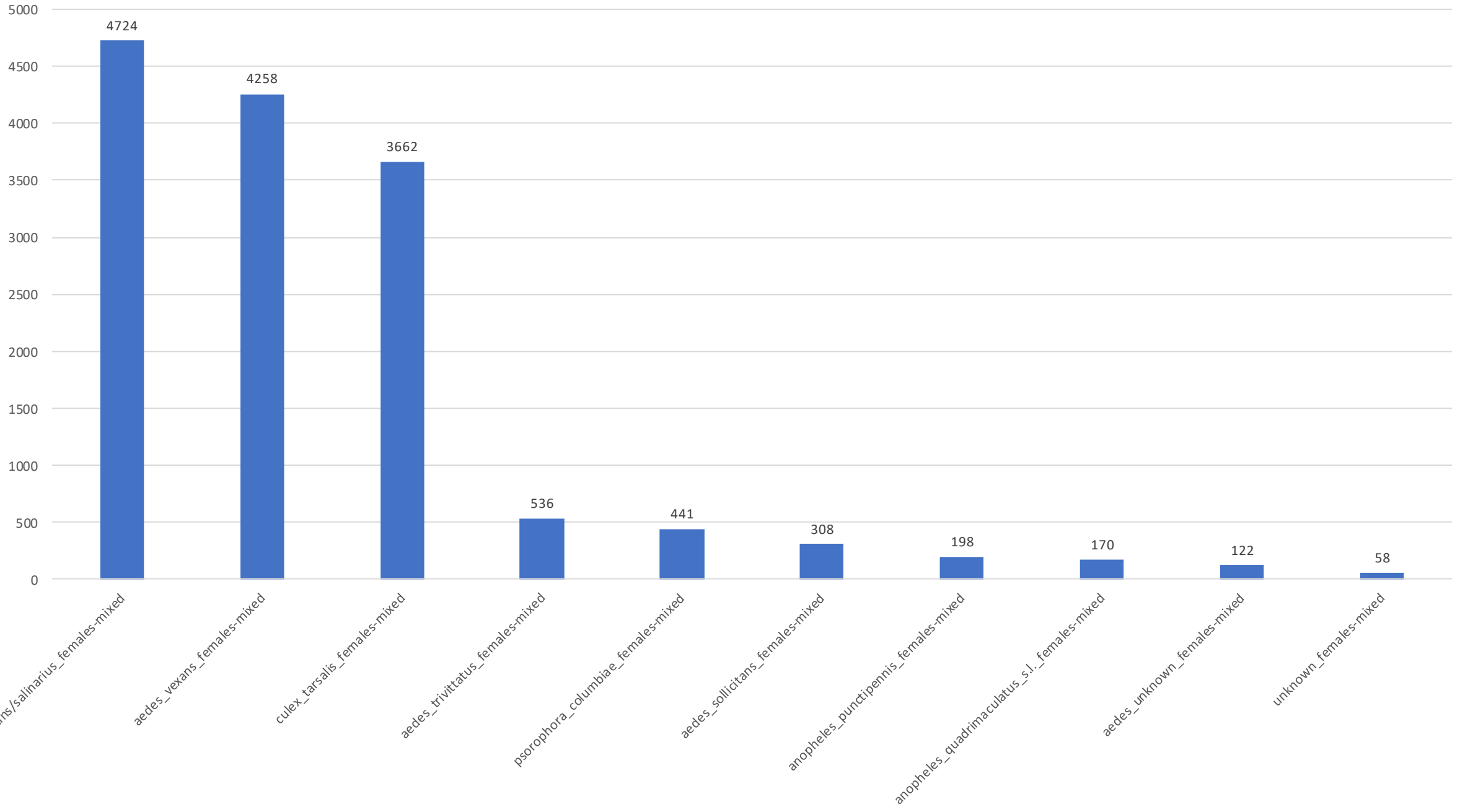
Top 10 Mosquitoes Collected During Mosquito Surveillance, Metro Vector Surveillance Region, 2023



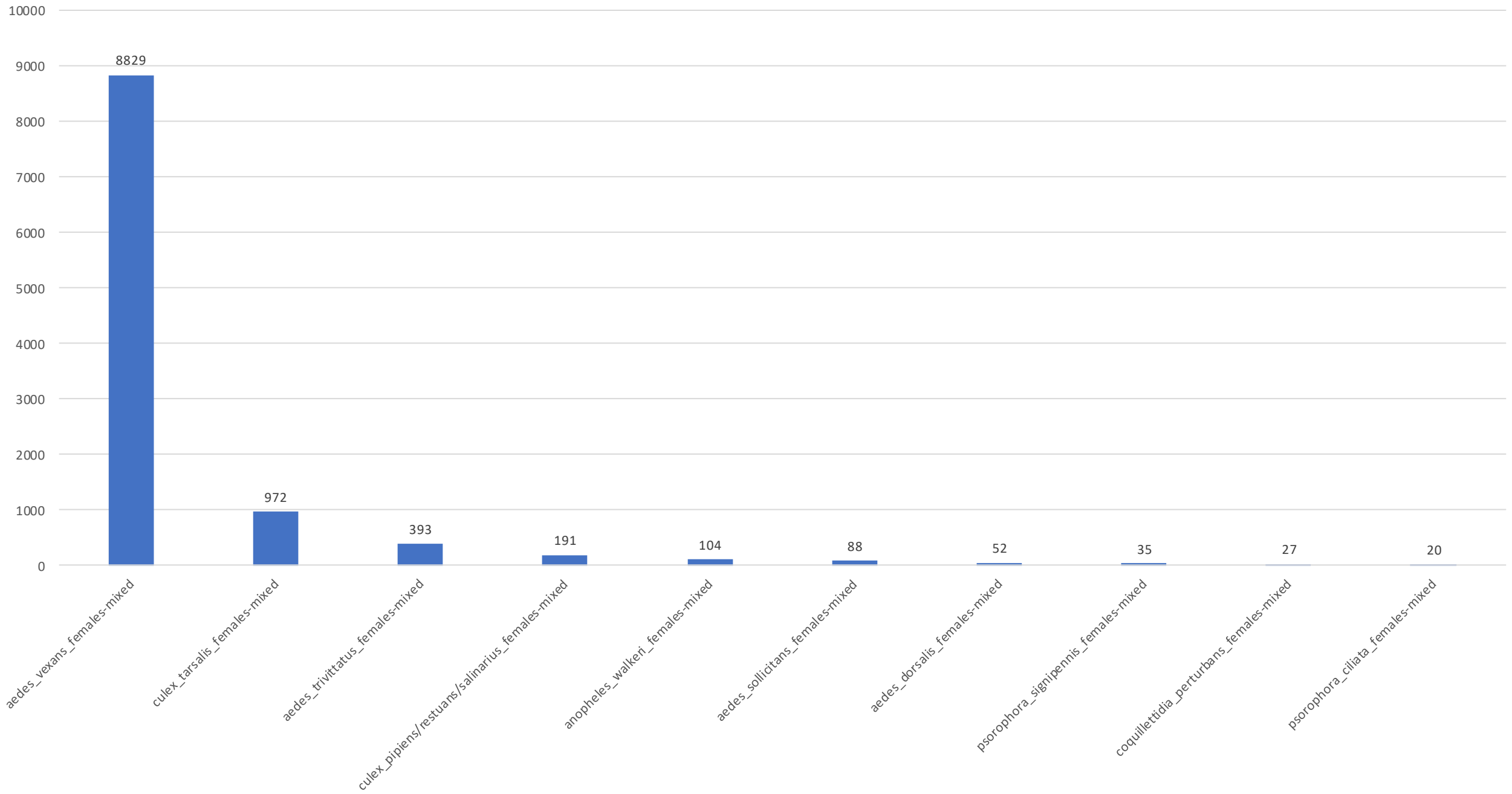
Top 10 Mosquitoes Collected During Mosquito Surveillance, North Vector Surveillance Region, 2023



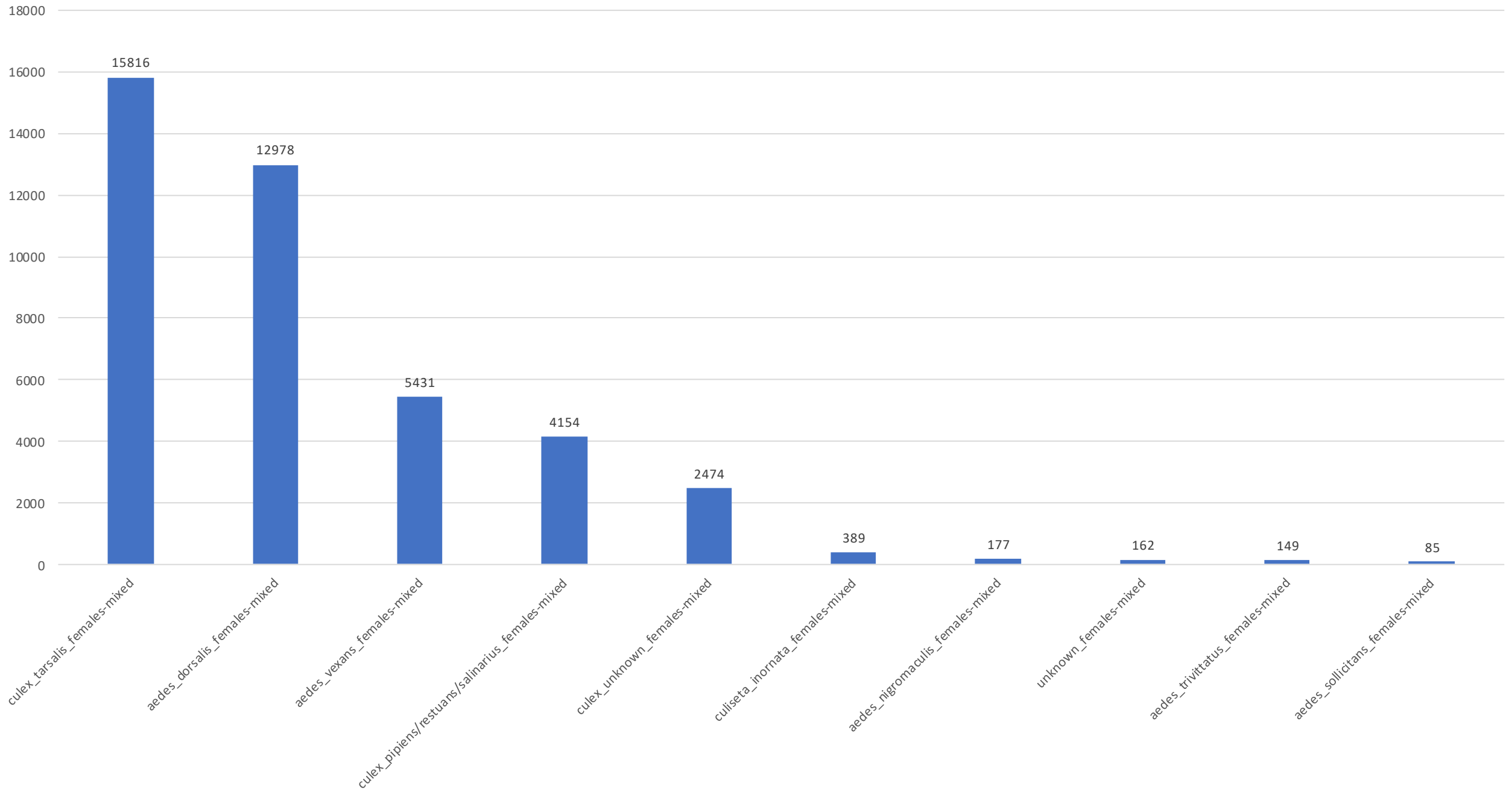
Top 10 Mosquitoes Collected During Mosquito Surveillance, South Central Vector Surveillance Region, 2023



Top 10 Mosquitoes Collected During Mosquito Surveillance, West Central Vector Surveillance Region, 2023



Top 10 Mosquitoes Collected During Mosquito Surveillance, Panhandle Vector Surveillance Region, 2023





MOSQUITO ARBOVIRAL TESTING

Credit: Nebraska Department of Health and Human Services,
Vector-Borne Disease Program

West Nile Virus Testing

- Mosquito pool testing results (from weeks 38 & 39)
 - 1568 pools from 21 counties have been tested so far this year.
 - 3 pools tested positive for WNV from 3 counties over the last two weeks.
 - 0 pools tested positive for St. Louis Encephalitis (SLE) virus over the last two weeks
 - 224 WNV positive (14.3%) mosquito pools have been detected from 18 counties so far this year.
 - 1 SLE positive (0.07%) mosquito pool has been detected from 1 county this year.
 - 6 of 6 vector surveillance regions have reported at least 1 WNV positive pool this season.
 - Positive WNV pools have been found in:
 - *Culex pipiens/restuans/salinarius* (n = 76)
 - *Culex tarsalis* (n = 133)
 - *Culex* unidentifiable (n = 15)

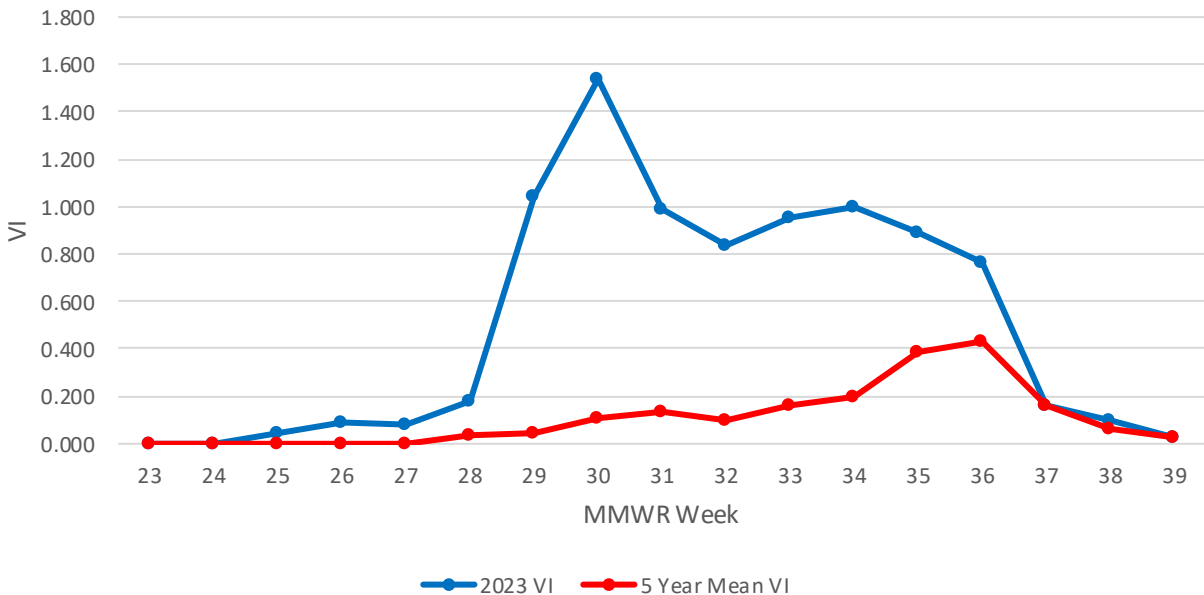


Credit: Nebraska Department of Health and Human Services,
Vector-Borne Disease Program

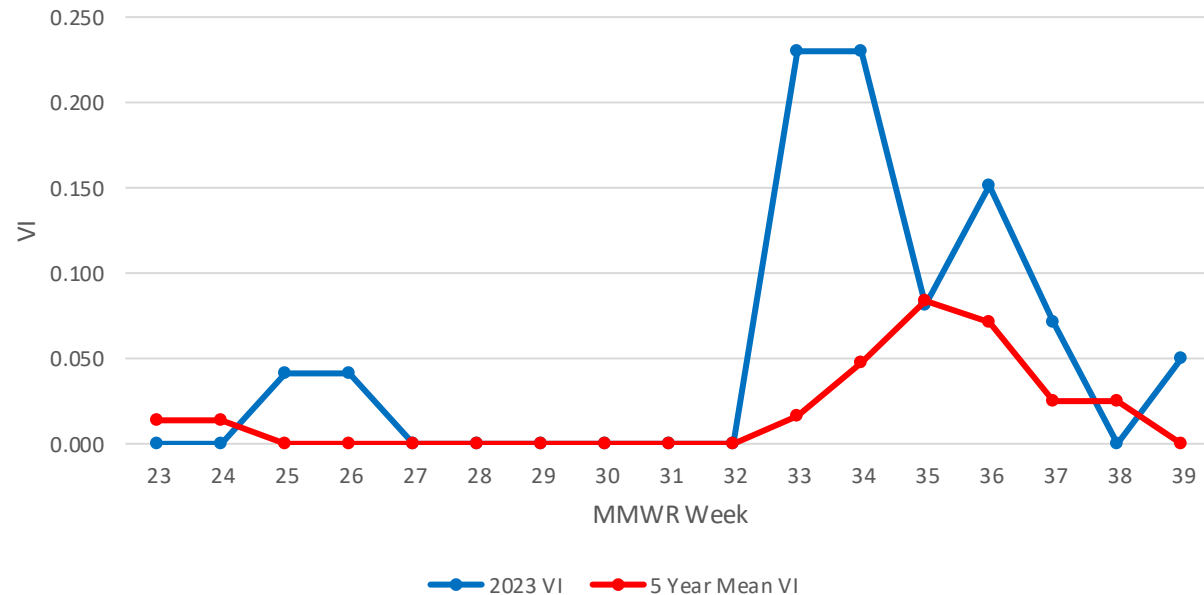
Nebraska WNV Mosquito Pool Testing

	Positive Pools (Weeks 38 / 39)		Cumulative Positive Pools Through Week 39		Week 38 / 39 Vector Index	
Region	2023	2022	2023	2022	2023	2022
Statewide	3	5	224	88	0.027	0.054
Southeast	1	0	8	4	0.050	0.000
Metro	1	0	6	6	0.053	0.000
North	0	0	9	8	0.000	0.000
South Central	1	5	38	68	0.040	0.044
West Central	0	0	7	1	0.000	0.000
Panhandle	0	0	156	1	0.000	0.000

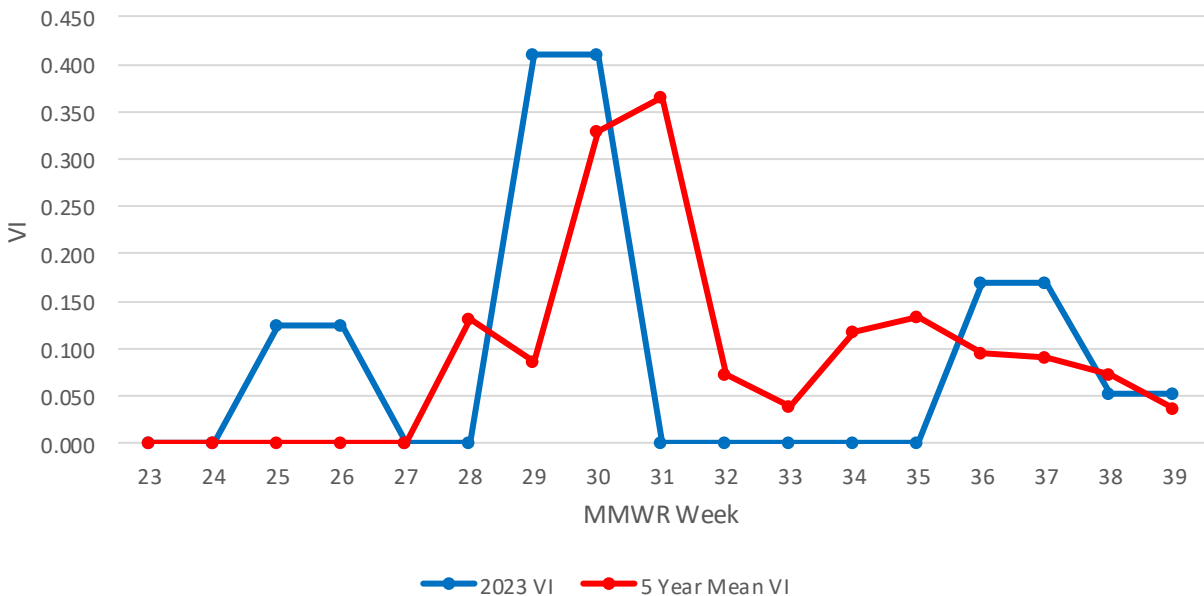
WNV Vector Index Nebraska Statewide, 2023



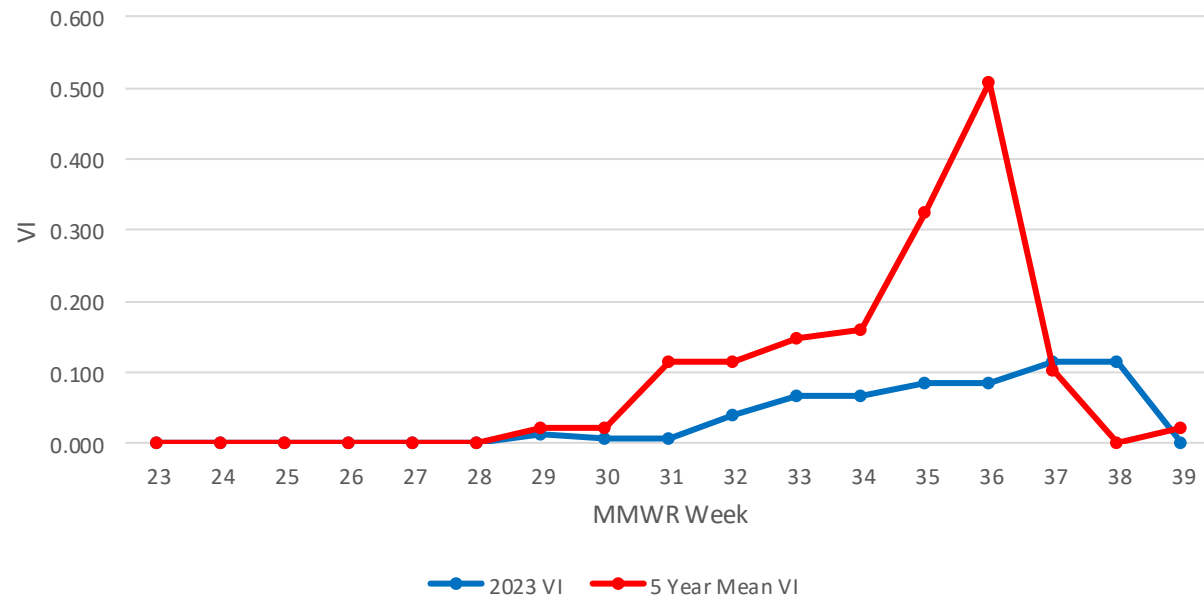
WNV Vector Index Southeast Vector Region, 2023



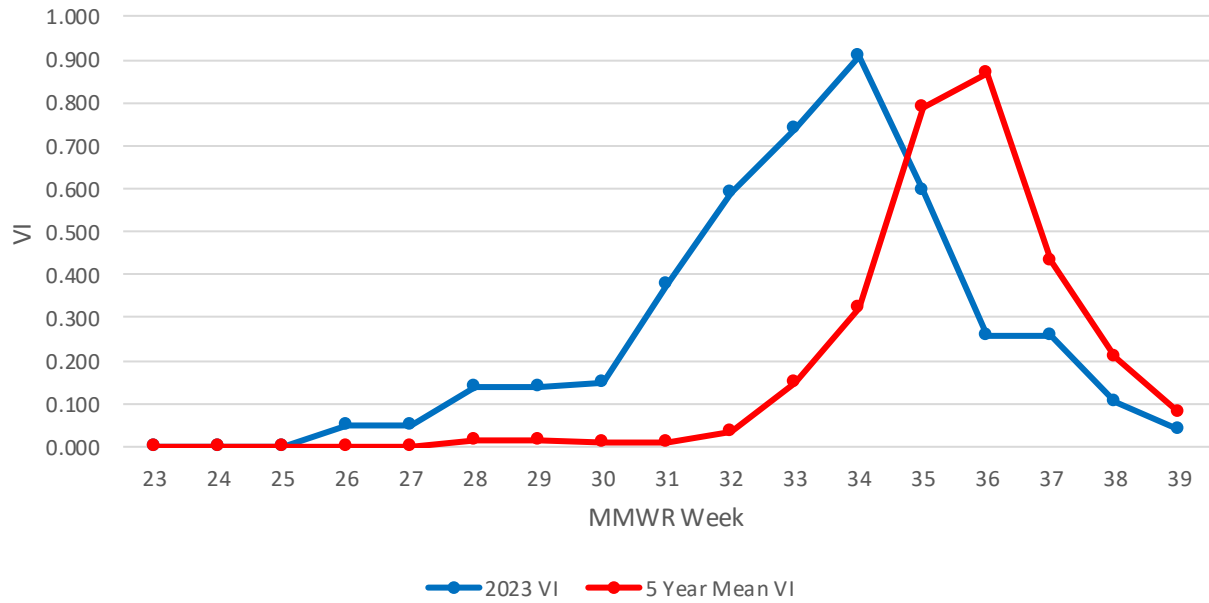
WNV Vector Index Metro Vector Region, 2023



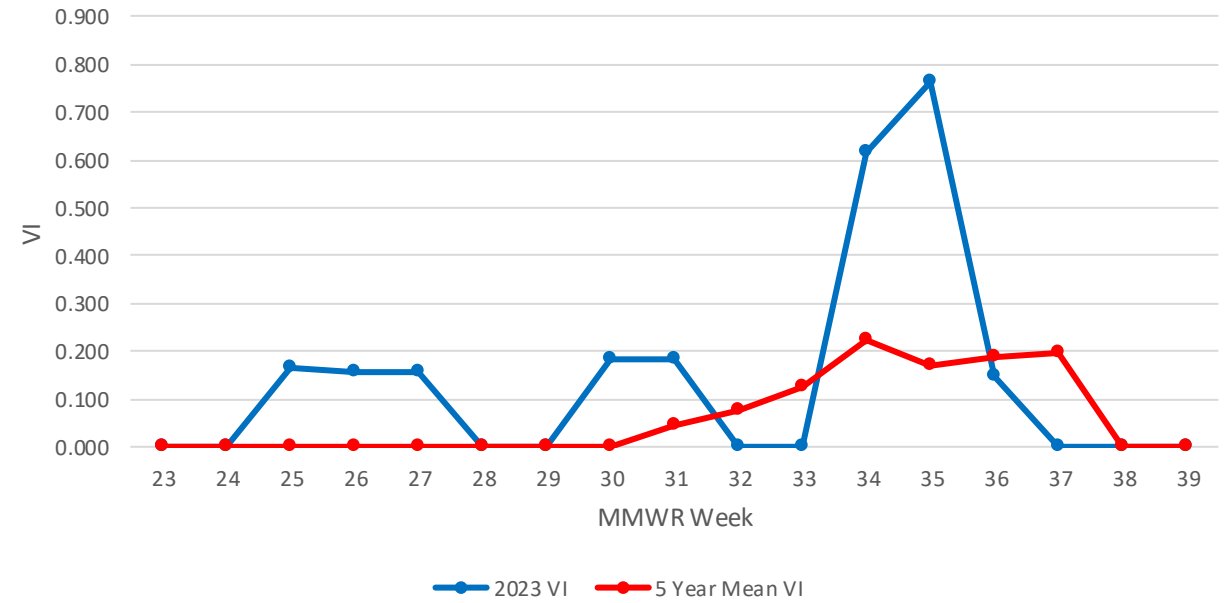
WNV Vector Index North Vector Region, 2023



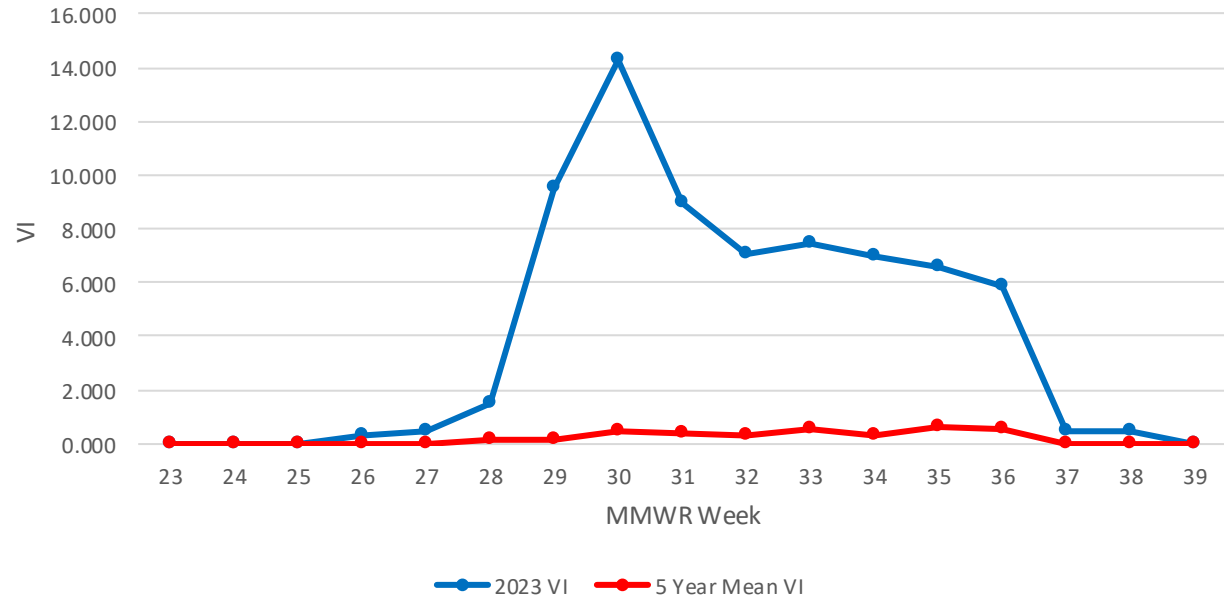
WNV Vector Index South Central Vector Region, 2023



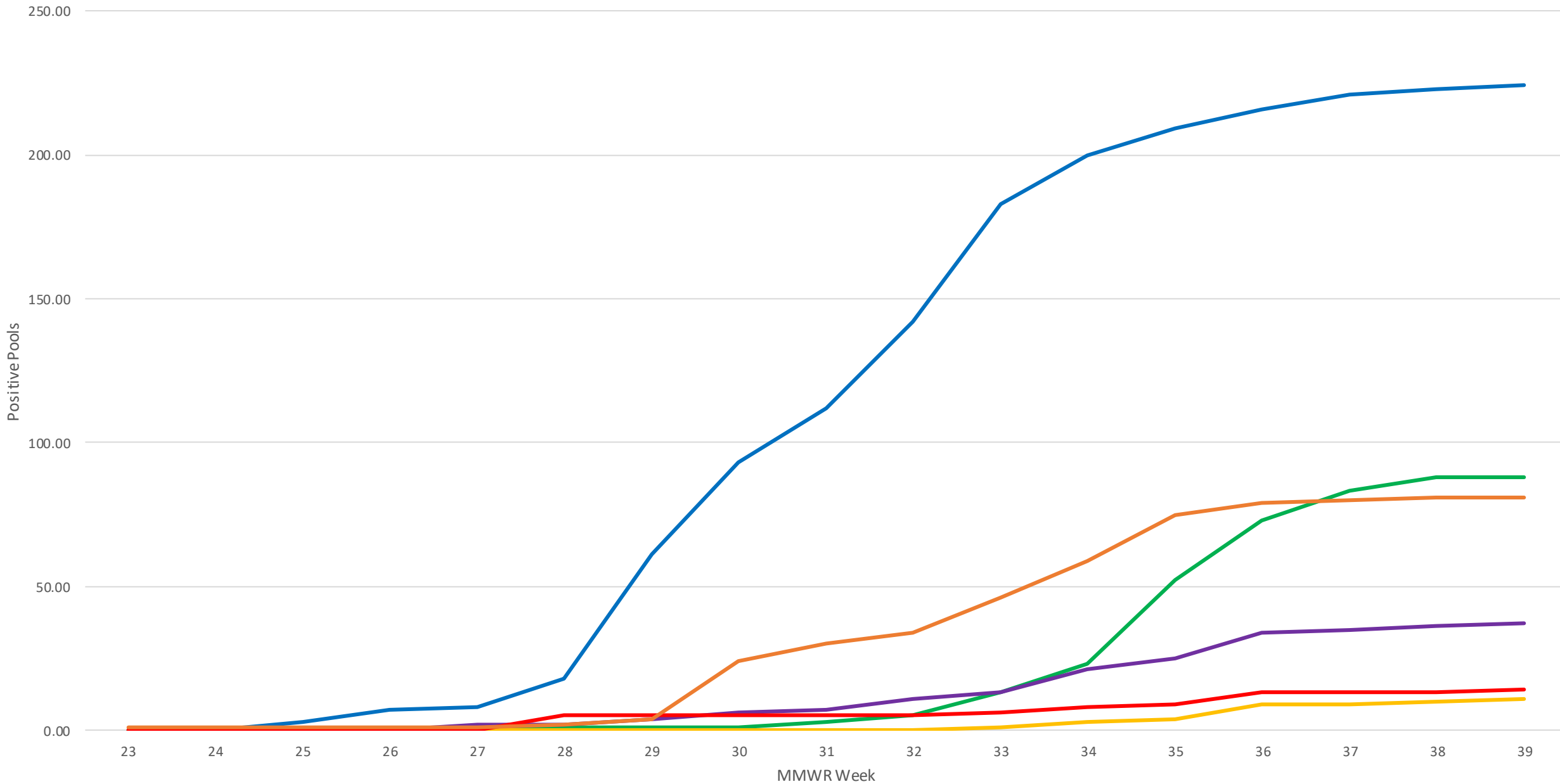
WNV Vector Index West Central Vector Region, 2023



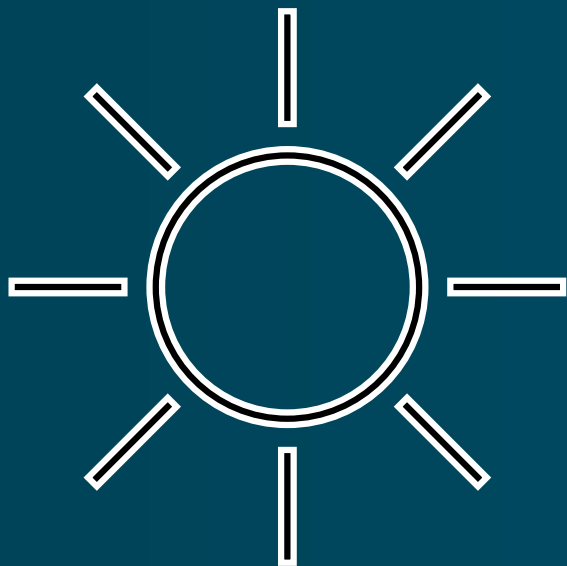
WNV Vector Index Panhandle Vector Region, 2023



WNV Cumulative Positive Pools Nebraska Statewide, 2018-2023



2023 2022 2021 2020 2019 2018



ENVIRONMENTAL CONDITIONS

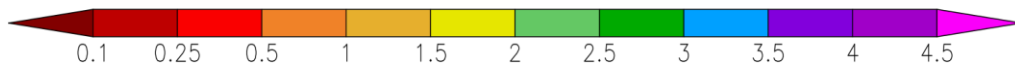
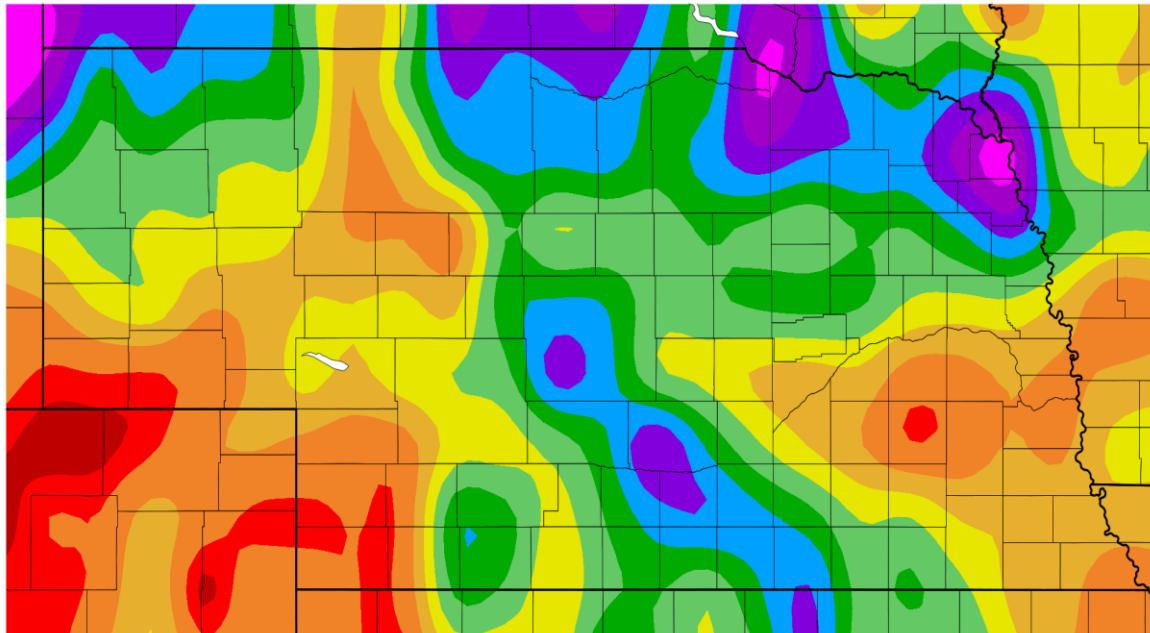


Environmental Conditions

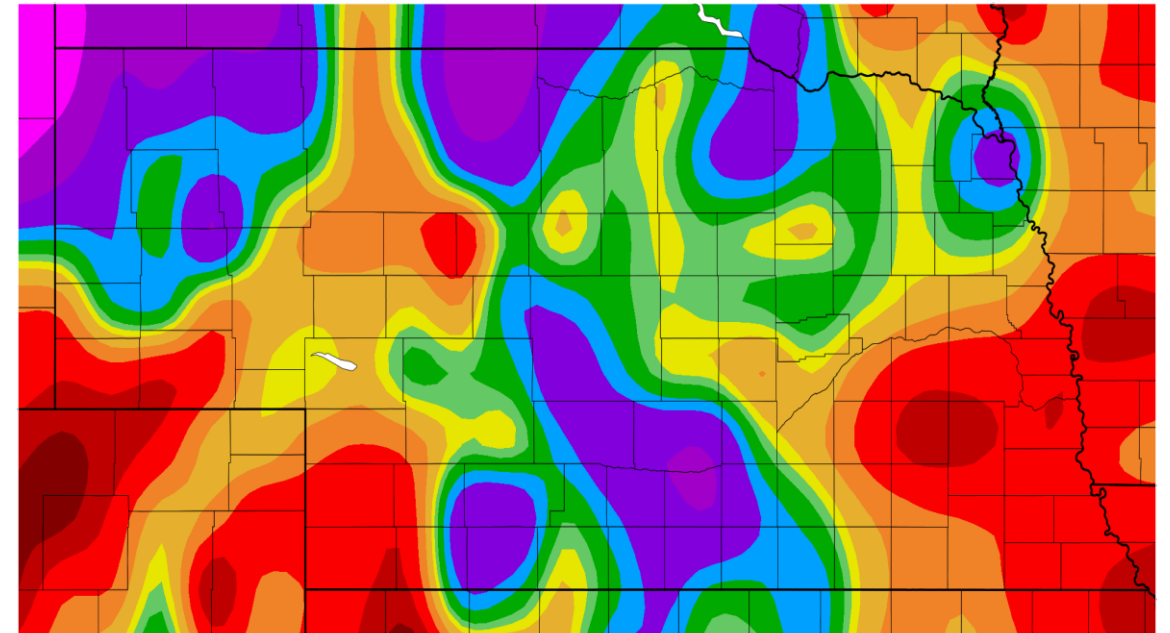
- Conditions can impact mosquito-borne diseases influencing mosquito numbers and mosquito infection prevalence.
 - Rainfall, temperature, and drought conditions are monitored closely during the mosquito surveillance season.
 - Figures on the preceding pages show precipitation and temperature data from the last 30 days across the state. Additional climate and forecast information can be found at:
 - High Plains Regional Climate Center: <https://hprcc.unl.edu/index.php>
 - National Weather Service 8-to-14-day outlooks: <https://www.cpc.ncep.noaa.gov/products/predictions/814day/index.php>
 - U.S. Drought Monitor: <https://droughtmonitor.unl.edu/>
 - Monthly U.S. Drought Outlook: https://www.cpc.ncep.noaa.gov/products/expert_assessment/mdo_summary.php



Precipitation (in)
9/3/2023 - 10/2/2023



Percent of Normal Precipitation (%)
9/3/2023 - 10/2/2023



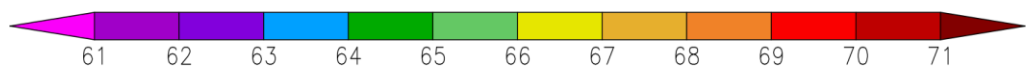
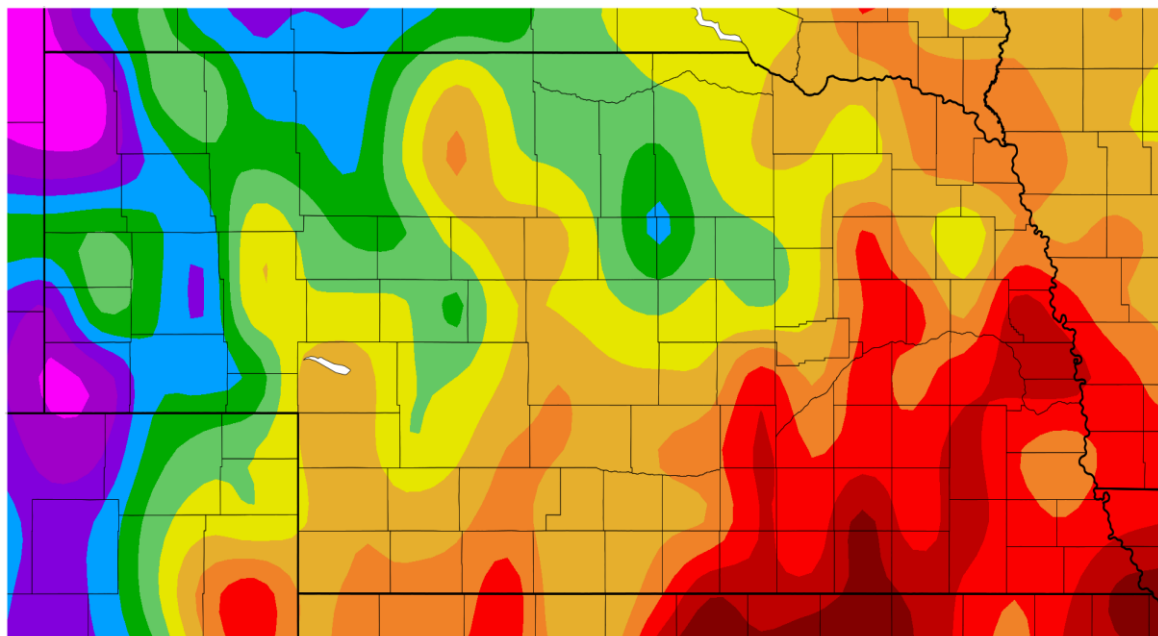
Generated 10/3/2023 at HPRCC using provisional data.

NOAA Regional Climate Centers

Generated 10/3/2023 at HPRCC using provisional data.

NOAA Regional Climate Centers

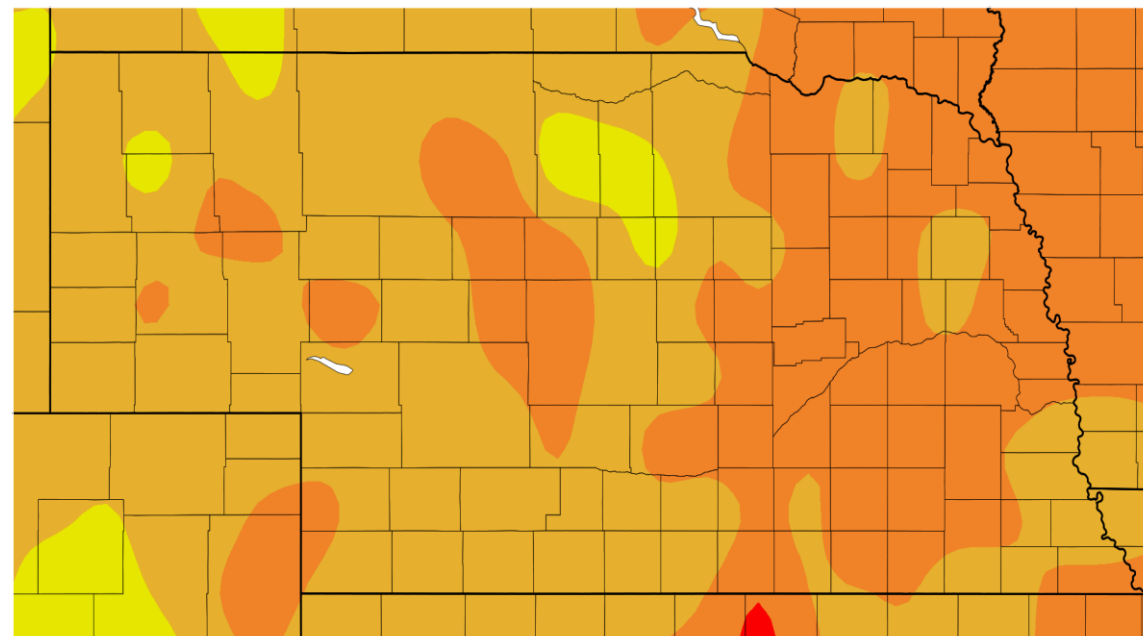
Temperature (F) 9/3/2023 - 10/2/2023



Generated 10/3/2023 at HPRCC using provisional data.

NOAA Regional Climate Centers

Departure from Normal Temperature (F) 9/3/2023 - 10/2/2023

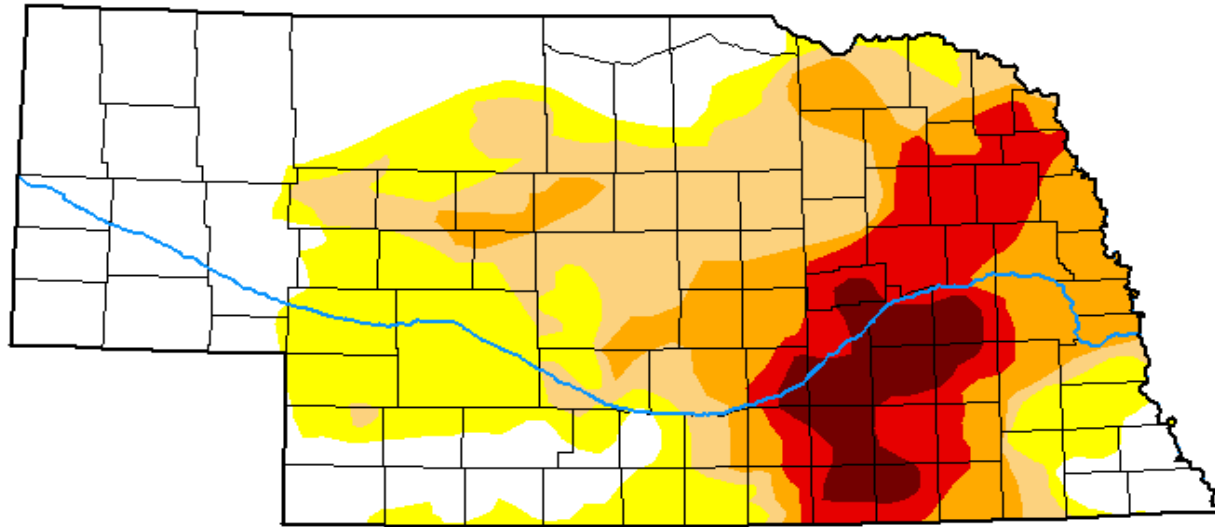


Generated 10/3/2023 at HPRCC using provisional data.







NOAA Regional Climate Centers

U.S. Drought Monitor Nebraska

September 26, 2023
(Released Thursday, Sep. 28, 2023)
Valid 8 a.m. EDT



Intensity:

-  None
-  D0 Abnormally Dry
-  D1 Moderate Drought
-  D2 Severe Drought
-  D3 Extreme Drought
-  D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

Author:

Richard Heim
NCEI/NOAA



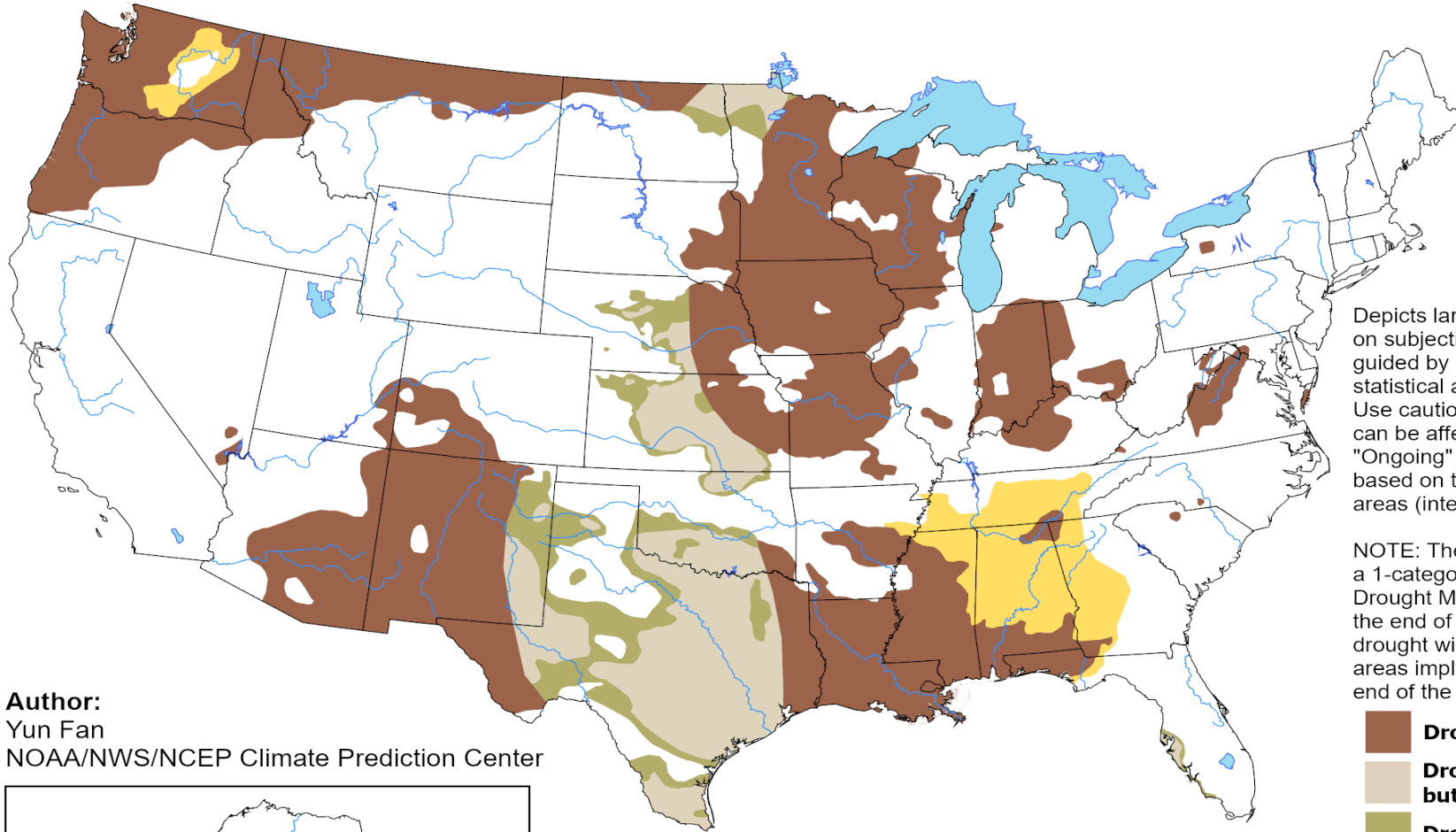
droughtmonitor.unl.edu

DIVISION OF
PUBLIC HEALTH

U.S. Monthly Drought Outlook

Drought Tendency During the Valid Period






Valid for October 2023
Released September 30, 2023

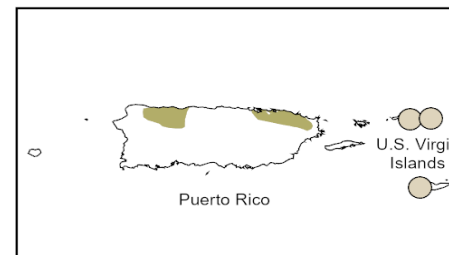
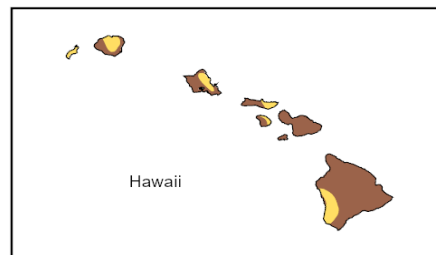


Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Use caution for applications that can be affected by short lived events. "Ongoing" drought areas are based on the U.S. Drought Monitor areas (intensities of D1 to D4).

NOTE: The tan areas imply at least a 1-category improvement in the Drought Monitor intensity levels by the end of the period, although drought will remain. The green areas imply drought removal by the end of the period (D0 or none).

Author:
Yun Fan
NOAA/NWS/NCEP Climate Prediction Center

-  **Drought persists**
-  **Drought remains, but improves**
-  **Drought removal likely**
-  **Drought development likely**
-  **No drought**



<https://go.usa.gov/3eZGd>

DIVISION OF
PUBLIC HEALTH

2023 EPI WEEK CALENDAR

Months shown in **RED** are potential "Vector" months

JANUARY

EPI Week #	Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	1	2	3	4	5	6	7
2	8	9	10	11	12	13	14
3	15	16	17	18	19	20	21
4	22	23	24	25	26	27	28
5	29	30	31				

FEBRUARY

EPI Week #	Sun	Mon	Tue	Wed	Thu	Fri	Sat
5				1	2	3	4
6	5	6	7	8	9	10	11
7	12	13	14	15	16	17	18
8	19	20	21	22	23	24	25
9	26	27	28				

MARCH

EPI Week #	Sun	Mon	Tue	Wed	Thu	Fri	Sat
9				1	2	3	4
10	5	6	7	8	9	10	11
11	12	13	14	15	16	17	18
12	19	20	21	22	23	24	25
13	26	27	28	29	30	31	

APRIL

EPI Week #	Sun	Mon	Tue	Wed	Thu	Fri	Sat
13							1
14	2	3	4	5	6	7	8
15	9	10	11	12	13	14	15
16	16	17	18	19	20	21	22
17	23	24	25	26	27	28	29
18	30						

MAY

EPI Week #	Sun	Mon	Tue	Wed	Thu	Fri	Sat
18		1	2	3	4	5	6
19	7	8	9	10	11	12	13
20	14	15	16	17	18	19	20
21	21	22	23	24	25	26	27
22	28	29	30	31			

JUNE

EPI Week #	Sun	Mon	Tue	Wed	Thu	Fri	Sat
22					1	2	3
23	4	5	6	7	8	9	10
24	11	12	13	14	15	16	17
25	18	19	20	21	22	23	24
26	25	26	27	28	29	30	

JULY

EPI Week #	Sun	Mon	Tue	Wed	Thu	Fri	Sat
26							1
27	2	3	4	5	6	7	8
28	9	10	11	12	13	14	15
29	16	17	18	19	20	21	22
30	23	24	25	26	27	28	29
31	30	31					

AUGUST

EPI Week #	Sun	Mon	Tue	Wed	Thu	Fri	Sat
31			1	2	3	4	5
32	6	7	8	9	10	11	12
33	13	14	15	16	17	18	19
34	20	21	22	23	24	25	26
35	27	28	29	30	31		

SEPTEMBER

EPI Week #	Sun	Mon	Tue	Wed	Thu	Fri	Sat
35						1	2
36	3	4	5	6	7	8	9
37	10	11	12	13	14	15	16
38	17	18	19	20	21	22	23
39	24	25	26	27	28	29	30

OCTOBER

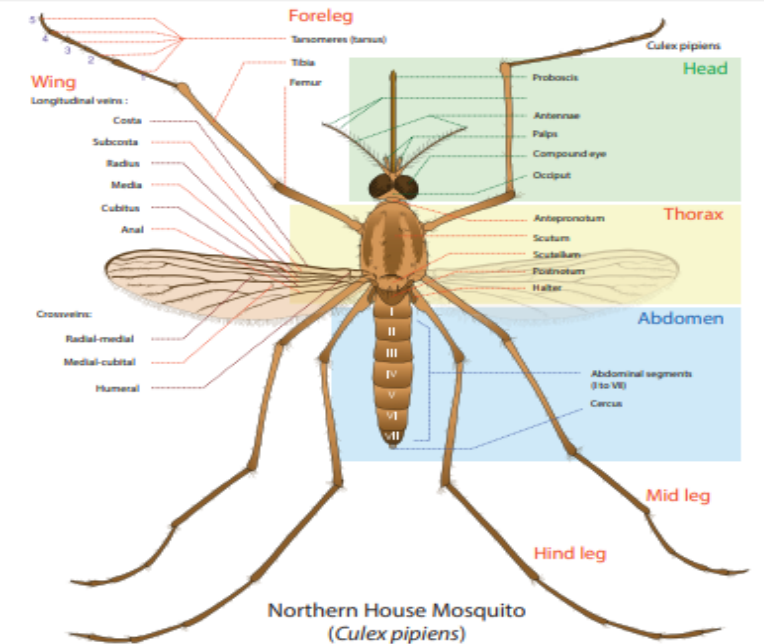
EPI Week #	Sun	Mon	Tue	Wed	Thu	Fri	Sat
40	1	2	3	4	5	6	7
41	8	9	10	11	12	13	14
42	15	16	17	18	19	20	21
43	22	23	24	25	26	27	28
44	29	30	31				

NOVEMBER

EPI Week #	Sun	Mon	Tue	Wed	Thu	Fri	Sat
44				1	2	3	4
45	5	6	7	8	9	10	11
46	12	13	14	15	16	17	18
47	19	20	21	22	23	24	25
48	26	27	28	29	30		

DECEMBER

EPI Week #	Sun	Mon	Tue	Wed	Thu	Fri	Sat
48						1	2
49	3	4	5	6	7	8	9
50	10	11	12	13	14	15	16
51	17	18	19	20	21	22	23
52	24	25	26	27	28	29	30
1	31						



Credit: Central Massachusetts Mosquito Control Project: <https://www.cmmcp.org/>

Resources

- CDC Prevent Mosquito Bites Page:
<https://www.cdc.gov/ncezid/dvbd/media/stopmosquitoes.html>
- CDC West Nile Virus Page:
<https://www.cdc.gov/westnile/index.html>
- Nebraska Department of Agriculture WNV Page:
<https://nda.nebraska.gov/animal/diseases/westnile/index.html>
- U.S. EPA Insect Repellent Page:
<https://www.epa.gov/insect-repellents>
- Nebraska Mosquito and Vector Control Association:
<https://www.nemosquito.org/>
- Nebraska Department of Health and Human Services Vector-Borne Disease Page:
<https://dhhs.ne.gov/Pages/Vector-borne-Disease.aspx>

