

Vector Surveillance Report

MOSQUITO RESEARCH AND CONTROL
NEW JERSEY AGRICULTURAL EXPERIMENT STATION

Vol. 2 No. 6

Period September 6-7, 1977

Introduction

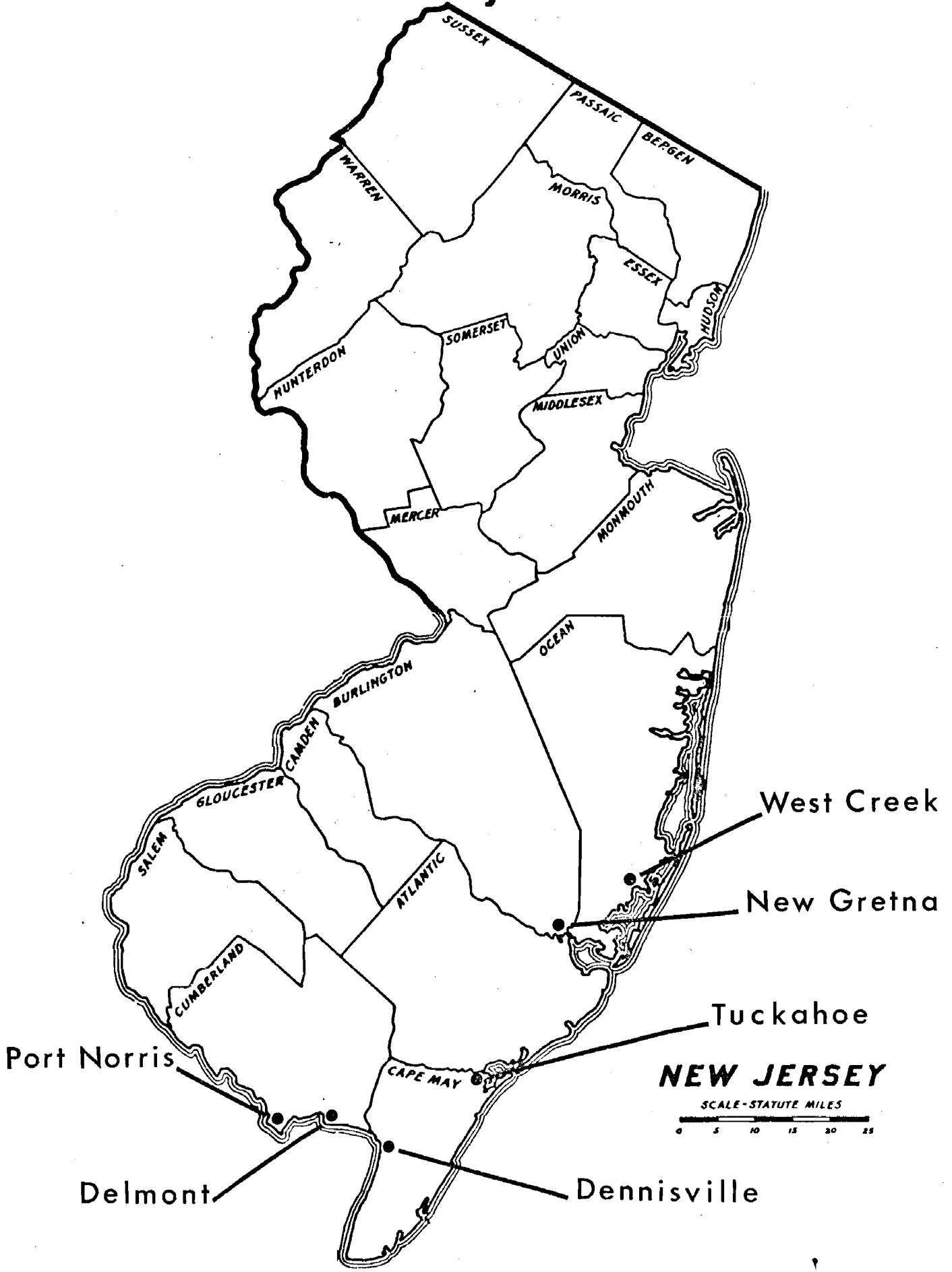
The Labor Day holiday postponed the Vector Surveillance trip by one day this week but a number of interesting observations were made during the period. The Aedes sollicitans are beginning to demonstrate their typical fall behavior where host-seeking is erratic and parous rates begin to show a nongeometric progression. Culiseta melanura are building steadily to produce the larvae which will overwinter and serve as the breeding stock for next year's populations. Culex tarsalis has been collected at enough different locations to clearly indicate that the species is established at low levels in at least the coastal portion of south-central New Jersey. Perhaps most important, Western encephalitis virus was isolated from Culiseta melanura by the New Jersey State Department of Health and virus activity was also detected in a pool of Cs. melanura collected during the Vector Surveillance Program. Hopefully, the data gathered during the course of the season will clarify the conditions where enzootic cycling of virus is possible and help define the parameters which lead to epizootic activity.

New Jersey State Department of Health Isolation of WE Virus

The New Jersey State Department of Health isolated Western encephalitis virus from a pool of Culiseta melanura collected at Dennisville on July 31. The isolation was made from a pool of 39 mosquitoes including 36 that were freshly engorged and 3 which contained blood in the final stages of digestion. The Dennisville site was the only area examined by the Vector Surveillance Program which maintained high populations of Cs. melanura through the summer months. In this respect, the area was atypical and the Cs. melanura were not representative of the populations throughout the State.

Data gathered during the Vector Surveillance Program show that the isolation was made during a population peak at that site. Parity was recorded at 60% on Aug. 2, the highest rate of the season. The combination of high numbers of mosquitoes plus a high parous rate in the population might be important. If the epizootic potential system utilized in last year's investigation were employed, the isolation would appear directly on the epizootic potential peak. >

Study Sites



A pool of Culiseta melanura collected from the Dennisville site on Aug. 23 showed evidence of virus activity in the initial screening and has been submitted to the N. J. State Department of Health for confirmation and identification. The Dennisville site was abnormal in terms of Cs. melanura throughout the season. The virus activity detected in this population to date suggests that continuity of Cs. melanura generations throughout the summer may be an important factor in the enzootic cycling of the encephalitis viruses.

The Epidemiology of Western Encephalitis

Western encephalitis virus is one of the more common mosquito-borne arboviruses in the United States. The virus is widespread but only assumes major medical importance West of the Mississippi River. The causal agent belongs to the same group as EE and is similar in many respects. Wild birds serve as the primary reservoir and the virus is extremely virulent to horses. An important difference is its virulence to humans. WE is far less severe and human mortality or permanent brain damage is not as extensive.

The Cycles in Nature

In the western United States, WE virus is maintained primarily by the mosquito Culex tarsalis. The mosquito is omnivorous and accepts a wide range of hosts. In most areas, Cx. tarsalis serves as the enzootic vector, epizootic vector and epidemic vector of the disease. Human and horse cases are mainly rural; thus outbreaks occur over a wide geographic area where populations are minimal.

WE virus is also common on the eastern seaboard but human cases have not been reported. The virus is most frequently isolated from Cs. melanura in the East and this mosquito is considered to be the major enzootic vector to birds in the area. Human cases stop West of the Mississippi River which marks the eastern range of Cx. tarsalis. Most authorities feel that a suitable epidemic vector is not present in the East, thus human cases do not occur even though the virus is common in birds.

The recent documentation of Cx. tarsalis in N. J. provides more than scientific curiosity and the fate of the mosquito should be followed over the next several years. Cx. tarsalis has been reported before in isolated pockets East of the Mississippi but the records from Long Beach Island and other areas on the coast place it directly within the belt where WE is maintained by Cs. melanura. Whether Cx. tarsalis can compete with native mosquito species in the area is unknown. If it can become established, however, an additional epizootic vector is available to help amplify the cycle within the birds in an area where humans are concentrated during the summer period of primary virus activity.

Hopefully, Cx. tarsalis will not be able to find a niche in a State where nearly 60 different species dominate the available breeding habitat. The introduction of a new species is always tenuous since the interloper must outcompete the native stock which has already laid claim to the habitat. Competition among species has been a subject of intense investigation over the past decade. The fate of Cx. tarsalis in New Jersey will be an interesting study.

Culiseta melanura

SITE NEW GRETNA

COUNTY Burlington

COLLECTION DATA

Date Sept. 6, 1977

No. Boxes

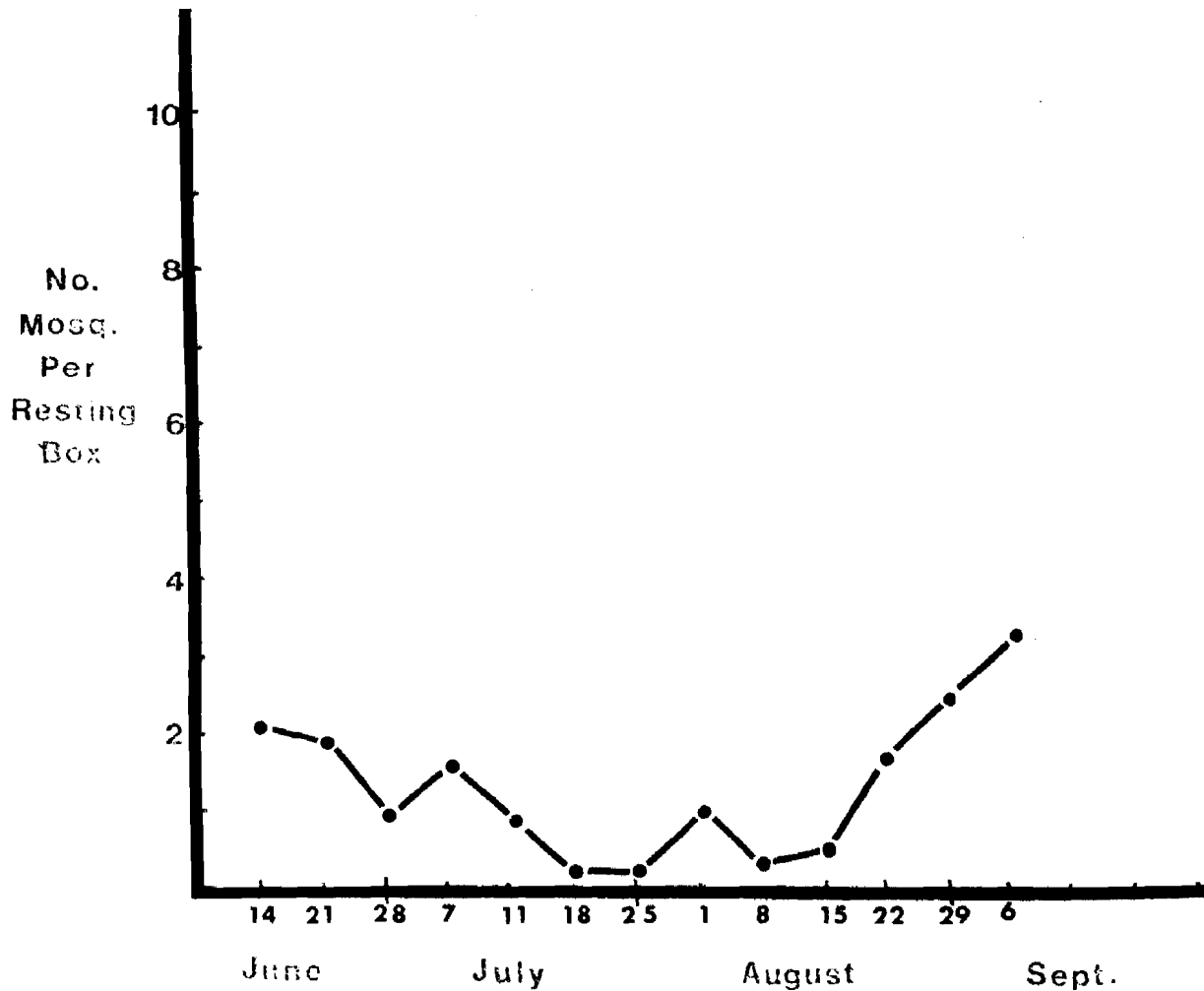
Examined: 25

Total C.mel. 80

C.mel./Box 3.2

REMARKS: This week's collection marks the 4th straight week where this population has shown an increase in numbers

CUMULATIVE RECORD



NOTES: Submitted 65 blooded and 15 nonblooded Cs. melanura from this population for virus assay.

Culiseta melanura

SITE DENNISVILLE

COUNTY Cape May

COLLECTION DATA

Date Sept. 6, 1977

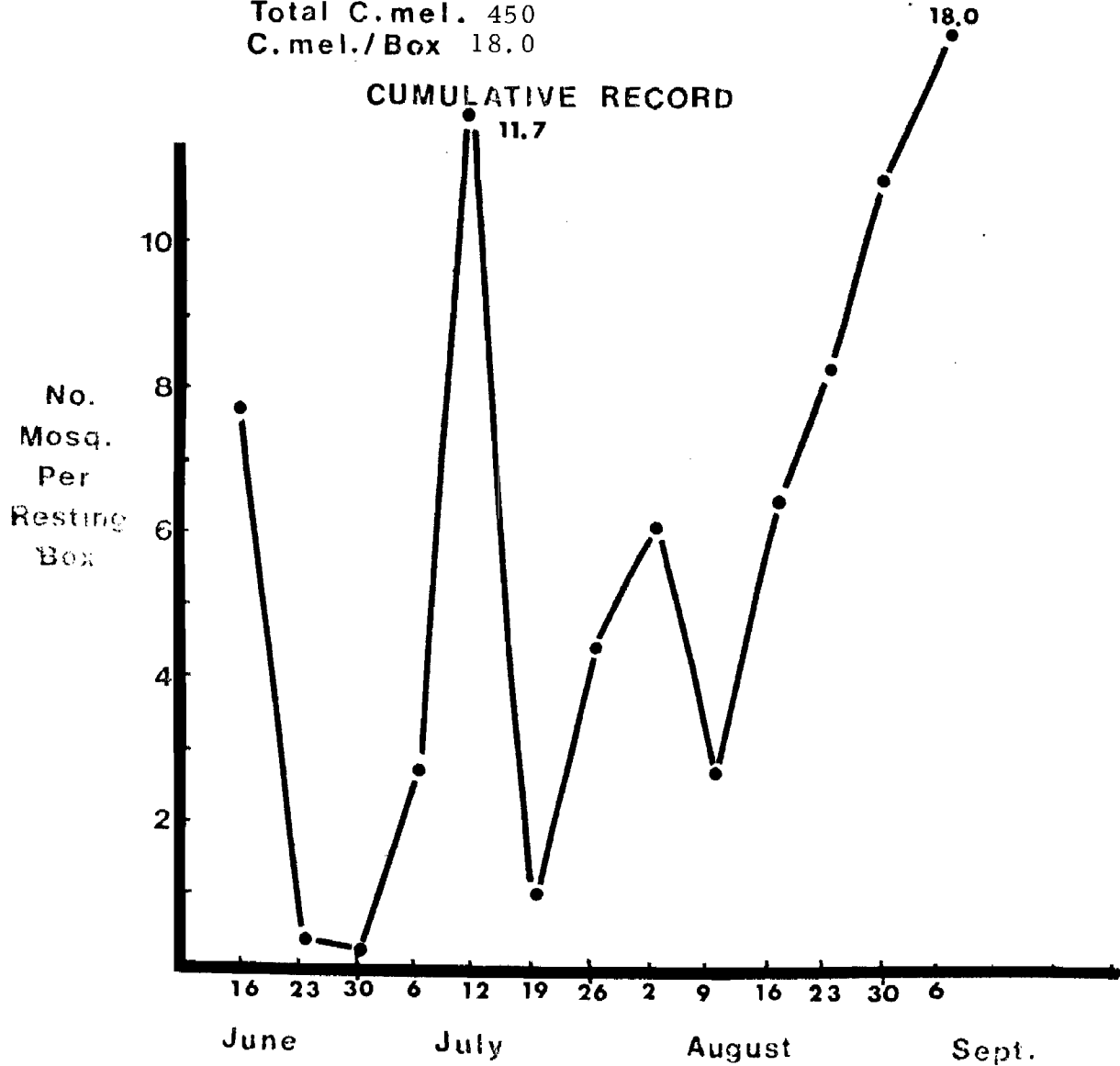
No. Boxes

Examined: 25

Total C. mel. 450

C. mel./Box 18.0

REMARKS: This population has also shown an increase each week for the past 4 weeks. The numbers are now the highest of the season. Parous rate recorded at 15%.



NOTE: Submitted 100 blooded and 350 nonblooded Cs. melanura from this population for virus assay. The N. J. State Dept. of Health isolated WE from this population on July 31, 1977. The initial screening of specimens collected Aug. 23 also tested positive for virus but has not yet been confirmed.

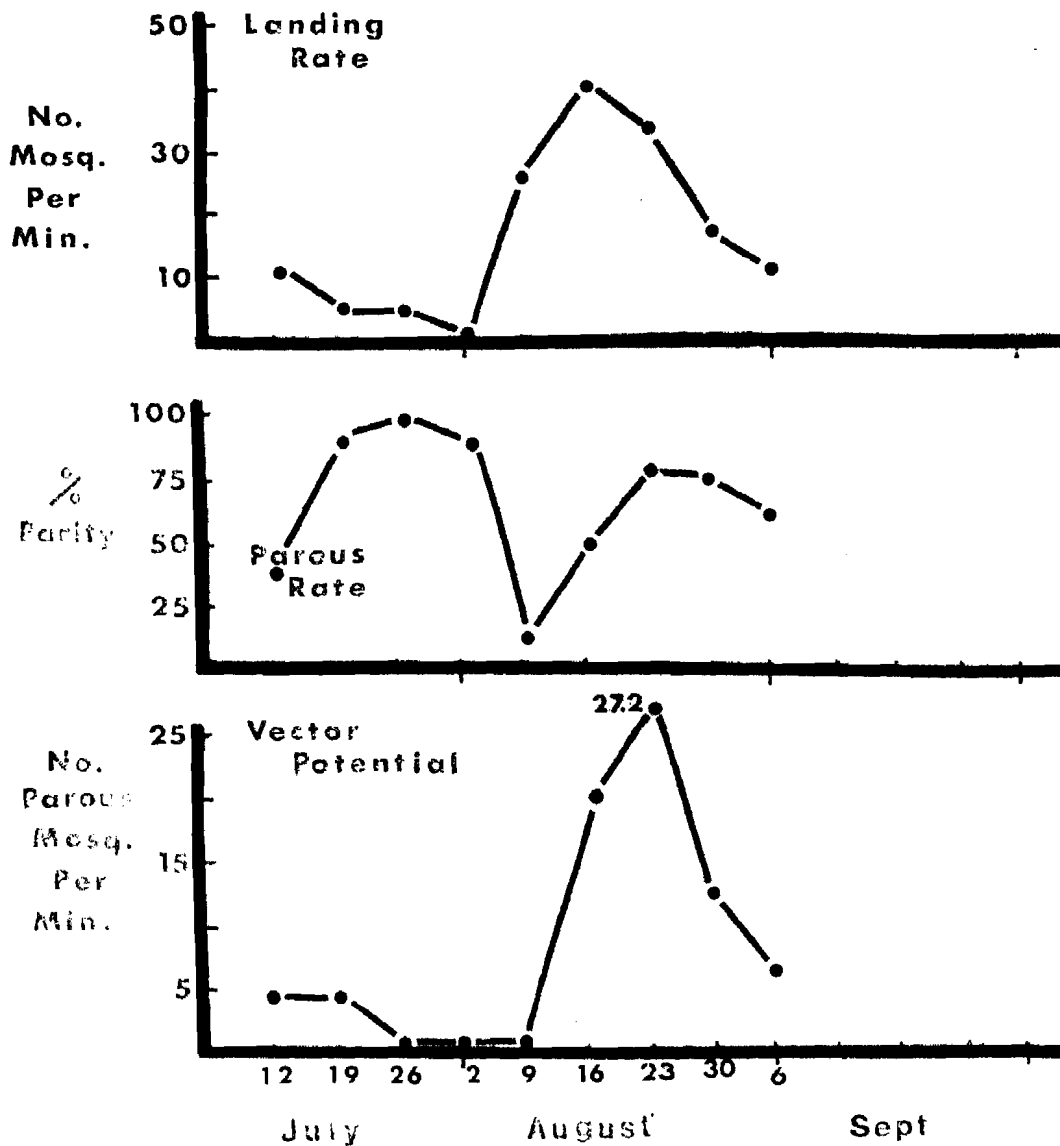
Aedes sollicitans

SITE PORT NORRIS
COUNTY Cumberland
COLLECTION DATA

Date Sept. 6, 1977
Landing Rate 11/min
Parous Rate 65%
Vector Potential 7.2
 (Parous Landing Rate)

REMARKS: This population appears to remain static.

CUMULATIVE RECORD



NOTES: Submitted 55 Ae. sollicitans from this population for virus assay.

Aedes sollicitans

SITE DENNISVILLE

COUNTY Cape May

COLLECTION DATA

Date Sept. 6, 1977

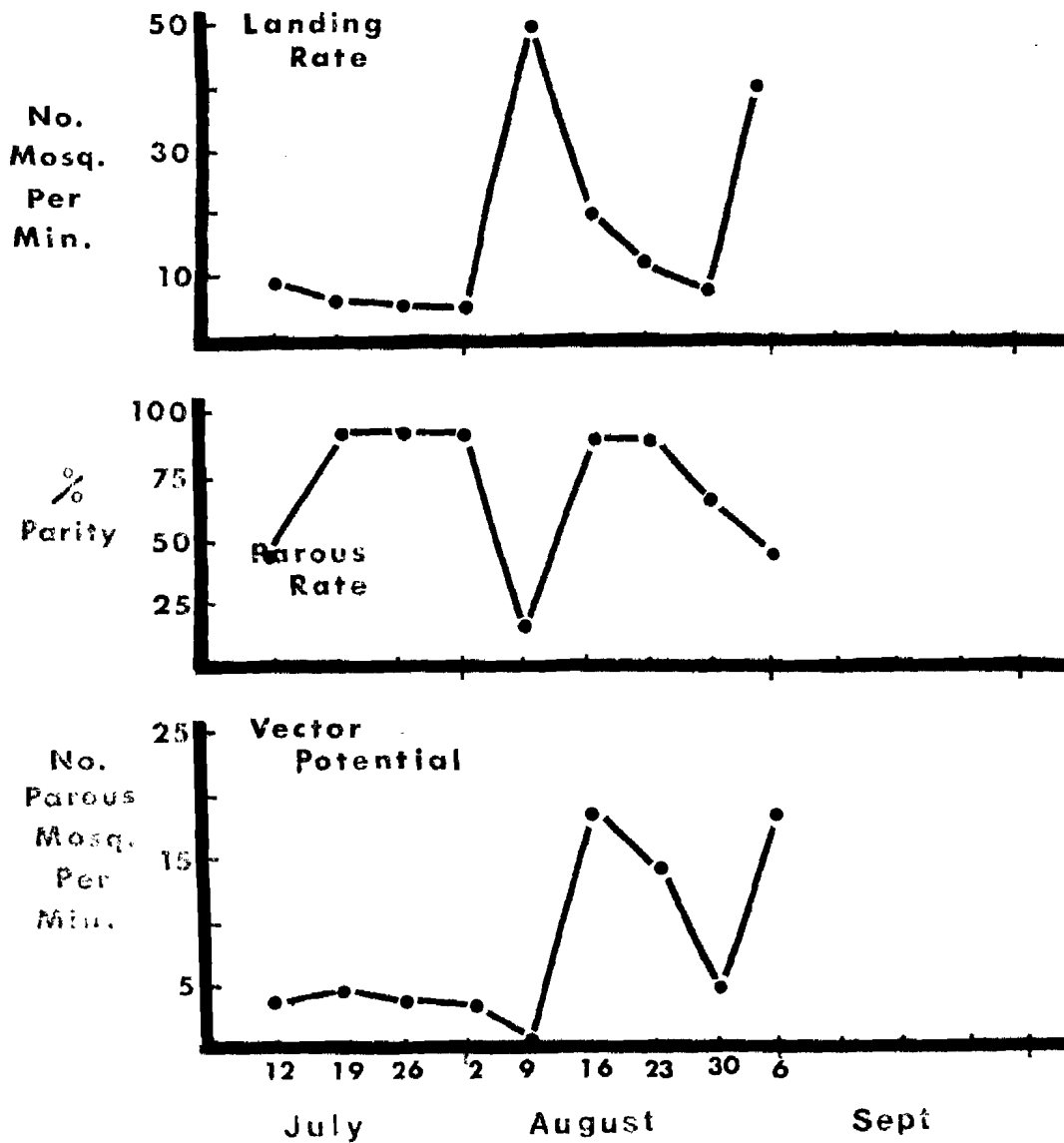
Landing Rate 40/min

Parous Rate 45%

Vector Potential 18.0
(Parous Landing Rate)

REMARKS: Continued emergence after the last airspray has resulted in continued annoyance as well as rising vector potential at this site.

CUMULATIVE RECORD



NOTES: Submitted 108 Ae. sollicitans from this population for virus assay.

Aedes sollicitans

SITE TUCKAHOE

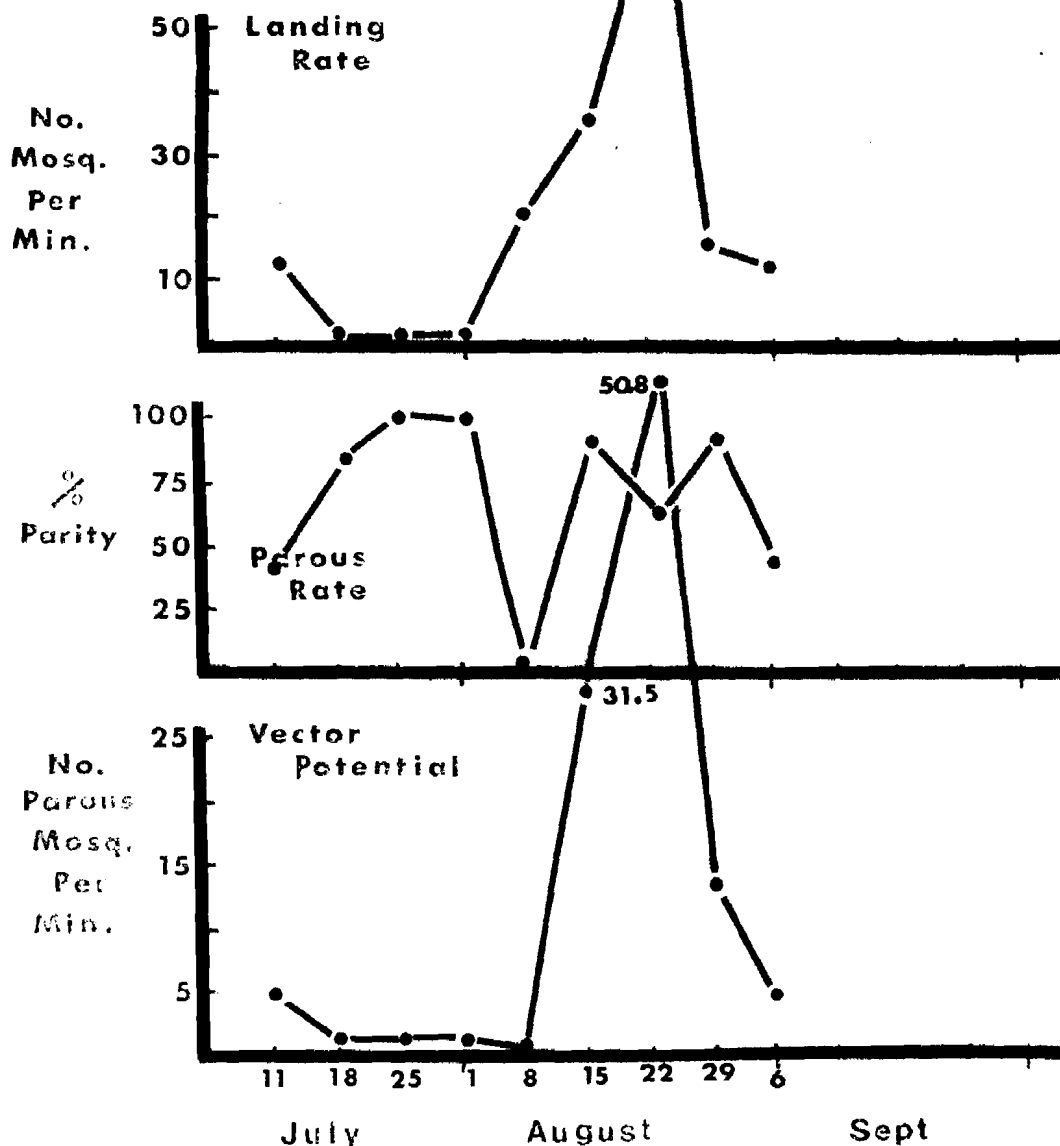
COUNTY Cape May

COLLECTION DATA

Date Sept. 6, 1977
Landing Rate 12/min
Parous Rate 45%
Vector Potential 5.4
 (Parous Landing Rate)

REMARKS: The vector potential of this population appears to have leveled off after the extreme peak in late August.

CUMULATIVE RECORD



NOTES: Submitted 115 Ae. sollicitans from this population for virus assay.

Aedes sollicitans

SITE WEST CREEK

COUNTY Ocean

COLLECTION DATA

Date Sept. 6, 1977

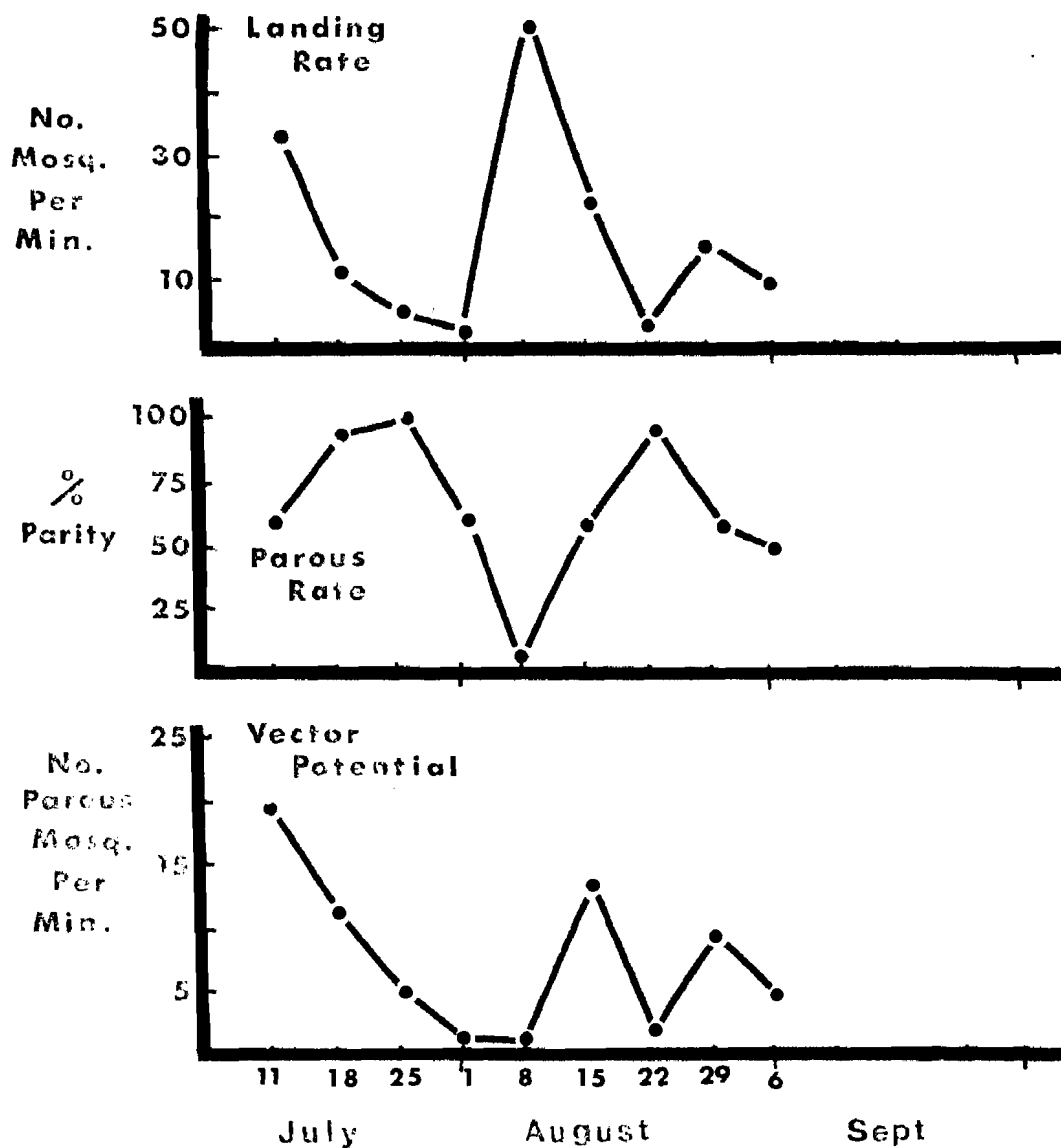
Landing Rate 10/min

Parous Rate 50

Vector Potential 5.0
(Parous Landing Rate)

REMARKS: The vector potential of this population has dropped over the past week but landing rates remain erratic.

CUMULATIVE RECORD



NOTES: This population received a Malathion ULV Airspray Sept. 2, 1977. Submitted 51 Ae. sollicitans for virus assay.

Results for the Period September 6-7, 1977

Aedes sollicitans

The advent of cool weather has resulted in erratic behavior in the Ae. sollicitans populations which make documentation more difficult to predict. In most areas, the Ae. sollicitans appear to have declined and vector potential has decreased. At Dennisville, the biting population has increased markedly but parity data indicate that fresh mosquitoes have been added to the population. The fall months are always a period where the mosquitoes behave unpredictably. A brood can emerge, remain nondetectable and then cause annoyance up to one week later. Parity dissections clearly reveal this behavior because nulliparous specimens which have never fed on blood show tracheal distentions which suggest that the mosquitoes are old, but have not yet found a host.

Vector potential normally increases markedly at this time of year as the mosquitoes appear to live longer. If the pattern holds true, isolated pockets of old mosquitoes will be evident over the next several weeks.

Culiseta melanura

The loss of summer help has necessitated that Cs. melanura monitoring be cut to the 2 sites where populations have been highest throughout the season. Each of these sites has shown a population increase as fall approaches. Cs. melanura have been steadily increasing since rain restored the breeding habitat in August. The collections this week were the highest of the season and the populations should soon be reaching their peaks.

As fall approaches, the majority of the mosquitoes will attain parity and the populations will decline. At the present time, however, Cs. melanura populations are at their highest levels of the season.

The Status of Culex tarsalis in New Jersey

One additional Culex tarsalis was collected in a special CDC light trap baited with CO₂ during the past week. The specimen was detected in a trap that was placed in an area on the mainland where Cx. tarsalis was not reported but where suitable habitat was suspected. The single specimen was recovered in a collection of more than 23,000 mosquitoes, primarily Cx. salinarius. Numerous collections have not yet been sorted, but the record shows that Cx. tarsalis is more widespread than suspected.

To date, a total of 7 Cx. tarsalis have been recorded from New Jersey. All have been coastal but the distribution has been spread over more than 30 miles. Larval surveillance has been initiated but no larvae have yet been found.

There is little question that Cx. tarsalis is breeding in New Jersey. The preferred habitat, however, has not been located. In all probability, a number of habitats are being utilized by this species at the present time. Data indicate that Cx. salinarius is probably the major associate species.

Aedes sollicitans

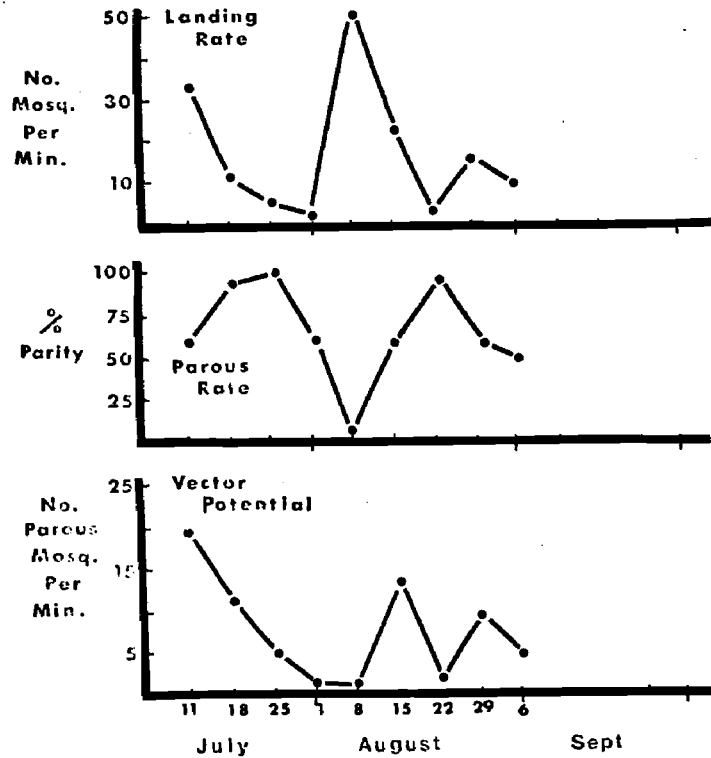
SITE WEST CREEK
COUNTY Ocean

COLLECTION DATA

Date Sept. 6, 1977
Landing Rate 10/min
Parous Rate 50
Vector Potential 5.0
(Parous Landing Rate)

REMARKS: The vector potential of this population has dropped over the past week but landing rates remain erratic.

CUMULATIVE RECORD



NOTES: This population received a Malathion ULV Airspray Sept. 2, 1977. Submitted 51 *Ae. sollicitans* for virus assay.

Aedes sollicitans

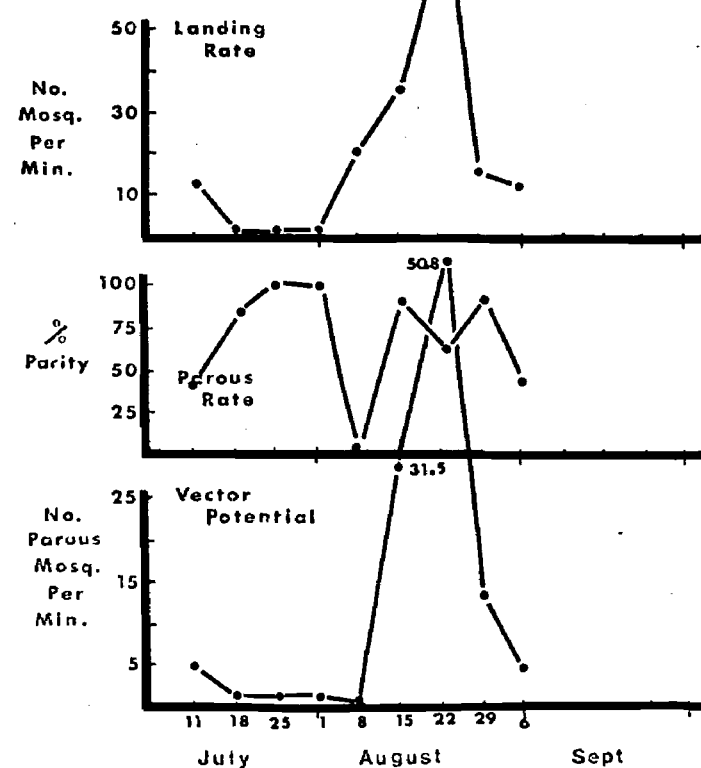
SITE TUCKAHOE
COUNTY Cape May

COLLECTION DATA

Date Sept. 6, 1977
Landing Rate 12/min
Parous Rate 45%
Vector Potential 5.4
(Parous Landing Rate)

REMARKS: The vector potential of this population appears to have leveled off after the extreme peak in late August.

CUMULATIVE RECORD



NOTES: Submitted 115 *Ae. sollicitans* from this population for virus assay.

Aedes sollicitans

SITE DENNISVILLE

COUNTY Cape May

COLLECTION DATA

Date Sept. 6, 1977

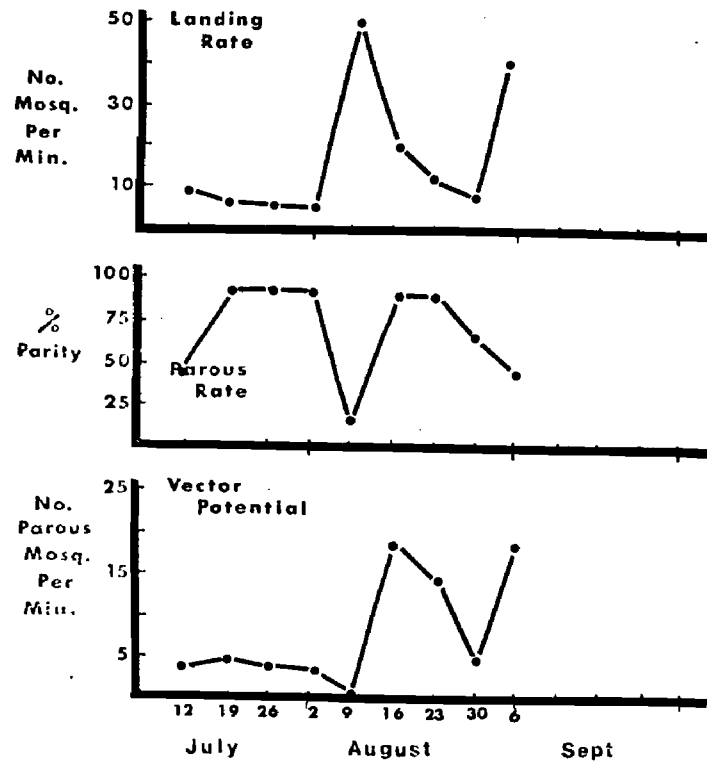
Landing Rate 40/min

Parous Rate 45%

Vector Potential 18.0
(Parous Landing Rate)

REMARKS: Continued emergence after the last airspray has resulted in continued annoyance as well as rising vector potential at this site.

CUMULATIVE RECORD



NOTES: Submitted 108 Ae. sollicitans from this population for virus assay.

Aedes sollicitans

SITE PORT NORRIS

COUNTY Cumberland

COLLECTION DATA

Date Sept. 6, 1977

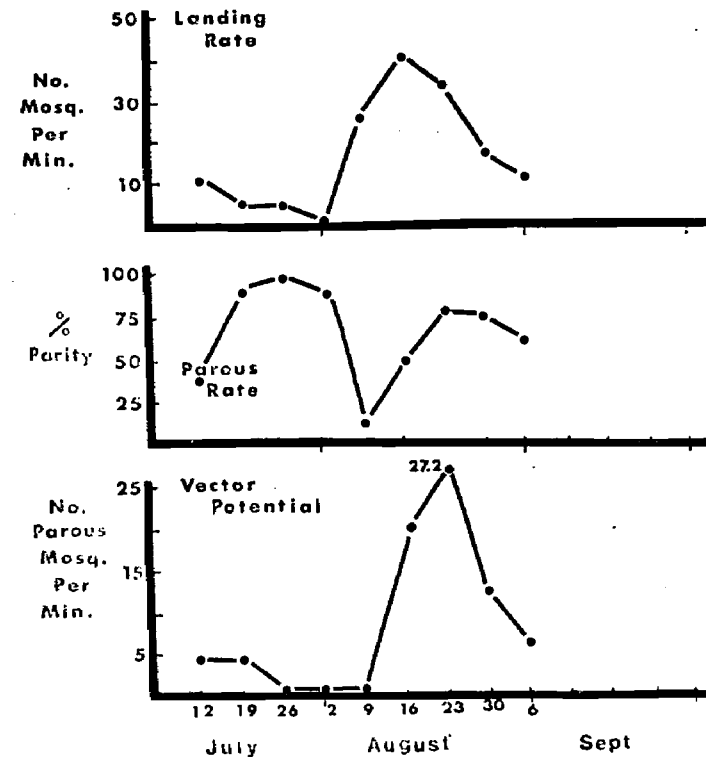
Landing Rate 11/min

Parous Rate 65%

Vector Potential 7.2
(Parous Landing Rate)

REMARKS: This population appears to remain static.

CUMULATIVE RECORD



NOTES: Submitted 55 Ae. sollicitans from this population for virus assay.

Culiseta melanura

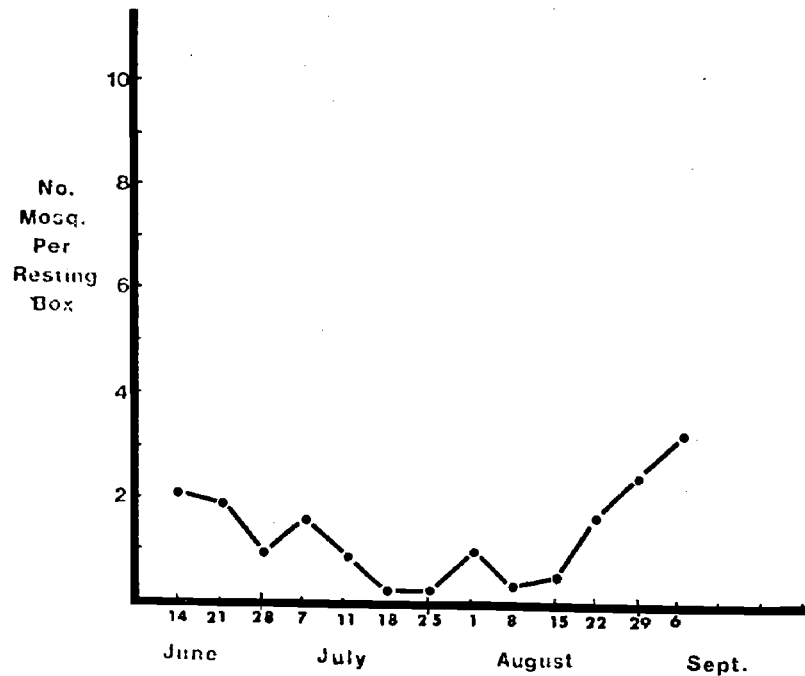
SITE NEW GREYNA
COUNTY Burlington

COLLECTION DATA

Date Sept. 6, 1977
No. Boxes
Examined: 25
Total C. mel. 80
C. mel./Box 3.2

REMARKS: This week's collection marks the 4th straight week where this population has shown an increase in numbers

CUMULATIVE RECORD



NOTES: Submitted 65 blooded and 15 nonblooded Cs. melanura from this population for virus assay.

Culiseta melanura

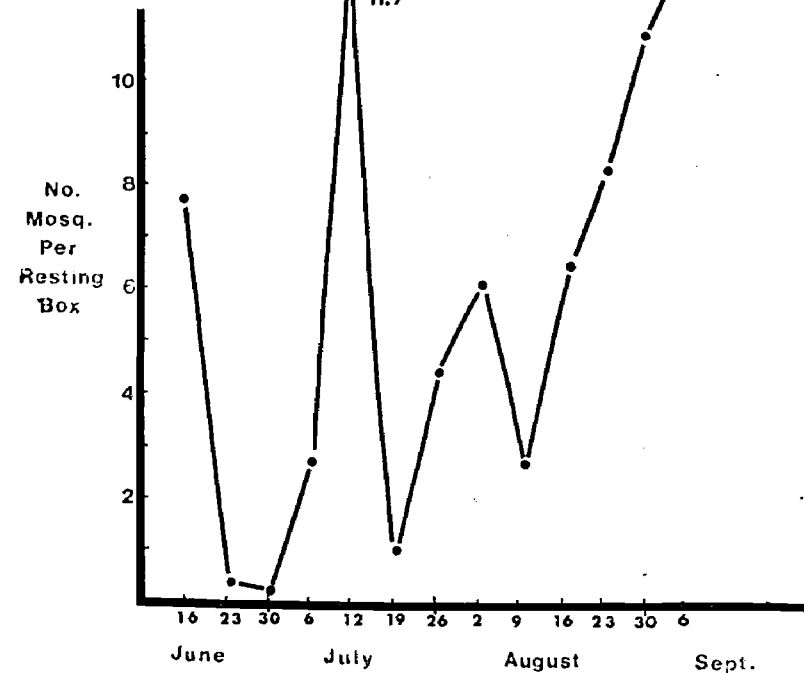
SITE DENNISVILLE
COUNTY Cape May

COLLECTION DATA

Date Sept. 6, 1977
No. Boxes
Examined: 25
Total C. mel. 450
C. mel./Box 18.0

REMARKS: This population has also shown an increase each week for the past 4 weeks. The numbers are now the highest of the season. Parous rate recorded at 15%.

CUMULATIVE RECORD



NOTES: Submitted 100 blooded and 350 nonblooded Cs. melanura from this population for virus assay. The N. J. State Dept. of Health isolated WE from this population on July 31, 1977. The initial screening of specimens collected Aug. 23 also tested positive for virus but has not yet been confirmed.

Data From Vineland Diagnostic Laboratories
 Culiceta melanura tested for EE virus during 1977

Date Collected	Area	No. Tested	Initial Screening	Confirmation of Positive Pools
7/25/77	New Gretna	5 blooded 3 nonblooded	Negative Negative	
7/26/77	Dennisville	19 blooded 186 nonblooded	Negative Negative	
8/01/77	New Gretna	32 blooded 16 nonblooded	Negative Negative	
8/02/77	Dennisville	37 blooded 116 nonblooded	Negative Negative	
8/02/77	Parlin	7 blooded	Negative	
8/08/77	New Gretna	5 blooded 3 nonblooded	Negative Negative	
8/08/77	Mays Landing	3 nonblooded	Negative	
8/09/77	Dennisville	10 blooded 39 nonblooded	Negative Negative	
8/15/77	Warren Grove	2 blooded 1 nonblooded	Negative Negative	
8/15/77	New Gretna	4 blooded 8 nonblooded	Negative Negative	
8/16/77	Dennisville	40 blooded 110 nonblooded	Negative Negative	
8/22/77	New Gretna	23 blooded 15 nonblooded	Negative Negative	
8/22/77	Warren Grove	2 blooded 3 nonblooded	Negative Negative	
8/22/77	Mays Landing	2 nonblooded	Negative	
8/23/77	Dennisville	49 blooded 159 nonblooded	POSITIVE Negative	
8/23/77	Parlin	2 blooded 1 nonblooded	Negative Negative	
8/29/77	New Gretna	46 blooded 13 nonblooded		
8/29/77	Mays Landing	2 blooded 1 nonblooded		
8/30/77	Dennisville	108 blooded 108 nonblooded		
9/6/77	New Gretna	65 blooded 15 nonblooded		
9/6/77	Dennisville	100 blooded 175 nonblooded		

Specimens Submitted for Virus Assay
 Aedes sollicitans

Date Collected	Area	No. Tested	Initial Screening	Confirmation of Positive Pools
8/15/77	West Creek	100	Negative	
8/15/77	Tuckahoe	381	Negative	
8/16/77	Dennisville	100	Negative	
8/16/77	Port Norris	175	Negative	
8/22/77	West Creek	30	Negative	
8/22/77	Tuckahoe	200	Negative	
8/23/77	Dennisville	100	Negative	
8/23/77	Port Norris	365	Negative	
8/29/77	West Creek	89		
8/29/77	Tuckahoe	161		
8/30/77	Dennisville	46		
8/30/77	Port Norris	100		
9/6/77	West Creek	51		
9/6/77	Tuckahoe	115		
9/6/77	Dennisville	108		
9/6/77	Port Norris	55		