

Vector Surveillance Report

MOSQUITO RESEARCH AND CONTROL
NEW JERSEY AGRICULTURAL EXPERIMENT STATION

Vol. 2 No. 3 Period August 15-16, 1977

Introduction

The brood of Aedes sollicitans which emerged from New Jersey's coastal salt marshes last week was sizeable in most areas of the State in spite of the intense larval control programs conducted by the various county mosquito control commissions. The brood was the result of tidal floodings as well as rain; thus vast sections of marsh were inundated and breeding was scattered over a very wide area. In many counties, repeated rains produced standing water on different sections of marsh over the course of the entire week. When this occurs, emergence takes place over an extended time period, and a new wave of freshly emerged adults is added to the biting population every few days.

Adult mosquito control is very difficult under these conditions and evaluating the effectiveness of individual applications is nearly impossible. Each time that an area is treated, the population is replaced by newly emerged adults. This results in erratic landing rates and nuisance which may even be more intense after the aerospray than it was before the treatment. These "extended" broods are the ultimate nightmare for people engaged in mosquito control because the work force must contend with larval inspection, larval control, adult surveillance, adult control and evaluation of both types of control at the same time. The logistics of conducting all of these activities simultaneously is practically impossible. If a county has both an upland problem with Culex species and floodwater Aedes as well, the public is bound to begin complaining before long.

New Jersey is currently experiencing this type of situation and every county mosquito control commission is working overtime to keep the mosquitoes below nuisance levels. Luckily, the dry weather of the past month or so has kept the permanent water breeders at a minimum, and encephalitis is not an immediate threat at the moment. Had these rains been preceded by an earlier period of wet weather, New Jersey might again be faced with an emergency situation. It is doubtful that the Cs. melanura can recover to the point where epizootic cycling of EE virus is possible with the exception of the Delaware Bay coast of Cape May County. That population bears close watching in view of the fact that numerous mosquitoes have survived the drought. The situation with SLE virus is less clear in New Jersey. SLE virus surveillance has proven to be too expensive to conduct on a routine basis and no one in New Jersey knows the status of this situation at the present time.

The higher than normal Ae. sollicitans populations have placed the State Airspray Program in a position of almost constant activity. Each of the coastal counties in southern New Jersey have requested aid in the past week, and the extended emergencies will undoubtedly require repeated treatments. The State Airspray Program together with the individual county mosquito control commissions forms the nucleus of mosquito control in New Jersey. The State Airspray Program like the Vector Surveillance Program operates under the jurisdiction of the New Jersey State Mosquito Control Commission. The objective is to protect New Jersey's residents from both nuisance and disease associated with the salt marsh mosquito.

THE STATE AIRSPRAY PROGRAM

The New Jersey State Airspray Program was initiated in 1949 to aid the shore counties of the State in the control of Ae. sollicitans. The service can be extended to upland counties when other mosquito species present an unusual problem but most of the Airspray Program's activities are directed toward the shore counties of Monmouth, Ocean, Atlantic, Burlington, Cape May and Cumberland. The Program is implemented whenever sizeable broods of the salt marsh mosquito become a nuisance or a disease threat.

A prescribed protocol is followed to insure the efficiency of the Program. The Superintendent of the county mosquito commission requiring the service requests an airspray and makes the arrangements with the airspray contractor. The police, FAA, State Office of Pesticides and the State Department of Environmental Protection are notified and notice is also given to the general public by radio and newspaper. During the actual treatment, a county commission representative either flies with the pilot or in a second aircraft to assure proper placement of the application to its source. Personnel from the county mosquito commission and the Airspray Program also monitor the application from the ground to assure complete and proper coverage.

Most of the airspray applications are directed against adult mosquitoes before they have dispersed using malathion/oil (0.9 oz/1 quart/acre), malathion ULV (3 oz/acre) or Dibrom ULV (1 oz plus 2 oz HAN/acre). The applications are made in areas where the mosquitoes are emerging to avoid flying over areas of high human habitation. When a brood appears particularly large, the Airspray Program can be used by a county for discriminant larviciding using Abate either as a granular treatment or a low volume liquid.

The amount of acreage treated by the Airspray Program varies each year according to the environmental factors which govern the mosquito populations. New Jersey experienced an exceptionally wet season in 1975 and human cases of

St. Louis encephalitis as well as horse cases of eastern encephalitis occurred in several areas. During that year, a total of 279,470 acres were treated. In 1976, the season was much drier thus only 141,456 acres received treatment. To date, 1977 appears to be midway between these two but the rest of August and September are yet to be realized.

Considerable monitoring is being conducted to increase the efficiency of the Airspray Program. Each application is evaluated with data taken before and after the treatment. Mosquito landing rates are made for the three days prior to an application and three days after to determine the immediate effect on the biting population as well as the rate of reinfestation after treatment. Several key areas are also being monitored to determine if airsprays are selectively killing a particular age group within the biting population. The information is made available to the county mosquito commissions and the cumulative data are used as guidelines for future applications.

Results for the Period August 15-16, 1977

Aedes sollicitans

The brood of Ae. sollicitans which began emerging more than a week ago is still very evident at each of the study sites. Numerous mosquitoes remain and the majority have had time to bloodfeed and lay their eggs. As a result, most of the biting population is seeking its second bloodmeal and vector potential is very high in most areas. The situation is not serious because EE virus does not appear to be active in N. J. this year. This brood does, however, demonstrate the potential of the salt marsh mosquito as a disease vector when it occurs in numbers. In spite of widespread larval control and repeated adult control of the populations in the 4 study sites, enough mosquitoes have survived to create vector potential ratings which are well above normal.

Data from the individual areas demonstrate the effects of the State Airspray Program on the vector potential of the populations. This information will be useful if New Jersey is ever faced with another EE emergency and the State Airspray Program is called upon for the actual prevention of disease.

West Creek in Ocean County experienced a series of separate emergences which created landing rates of 100 per minute or more along the coast. The populations were treated on 2 separate occasions but nuisance returned quickly as fresh mosquitoes were added. Data show that these airsprays reduced the landing rates but also kept the parous rate lower than in other areas. This had a significant effect on vector potential. West Creek had the lowest vector potential rating of the 4 sites that were studied even though they had the severest mosquito problem.

The Tuckahoe site which is also on the Atlantic coast represents the opposite extreme. No State Airspray was flown over the actual study site because the area is a wildlife preserve. The landing rates remained high and the parous rate of the biting population climbed to 90%. This combination gave the highest vector potential rating ever recorded in these studies. Data indicated that an individual exposed for only one minute at this site could receive as many as 31 bites from mosquitoes that had already fed on another animal. The potential for disease transmission under these circumstances is tremendous. The team could not believe the data and repeated the dissections on a fresh collection but came up with exactly the same results.

Data from Dennisville also showed a high parous rate and vector potential rating for the Ae. sollicitans in that area but the figures were only half those obtained at Tuckahoe. The Dennisville site received a single State Airspray on August 10 and data indicated that few fresh specimens have been added to the population in the past week.

The vector potential rating at Port Norris was very similar to that at Dennisville but under very different circumstances. Port Norris received a State Airspray on August 9 but mosquitoes have been emerging from the surrounding hay meadows ever since. This is revealed by the high landing rates at the moment and the lowering parous rate of the biting population over the past few days. The emergence was even more evident in other areas of Cumberland County which required recent treatment to reduce the second wave of extreme nuisance.

These data from the past few weeks suggest that adult mosquito control can be used to reduce vector potential as well as nuisance. The reduction is not permanent however and reinfestation would probably require repeated treatments in most cases. Considerably more information is needed to determine the best timing of an application. Hopefully, this information will be accumulated prior to an emergency situation rather than during one.

Culiseta melanura

Relatively little change was noted in the status of the Cs. melanura populations. The mosquitoes remain low in all of the sites except Dennisville. The recent rains have restored some of the breeding habitat for this species and the appearance of males in the resting boxes at all sites suggest that the numbers may increase over the next week or two. Cs. melanura normally shows a population peak at this time of year to provide larvae for the overwintering generation. To date the numbers have been much lower than those recorded in previous years. It will be interesting to follow this species for the remainder of the year.

New Jersey State Department of Health Observation

The New Jersey State Department of Health recovered a single Culex tarsalis from a resting box in the New Gretna site on August 12. This is the second record of this western species in as many years.

The first specimen was collected and identified by the Ocean County Mosquito Commission from a light trap at Beach Haven, N. J. on August 26, 1975. An account of the record appeared in a recent issue of Mosquito News. The specimen collected and identified by the New Jersey State Department of Health was taken within 6 miles of the first record. The close proximity suggests that the species may actually be breeding in New Jersey.

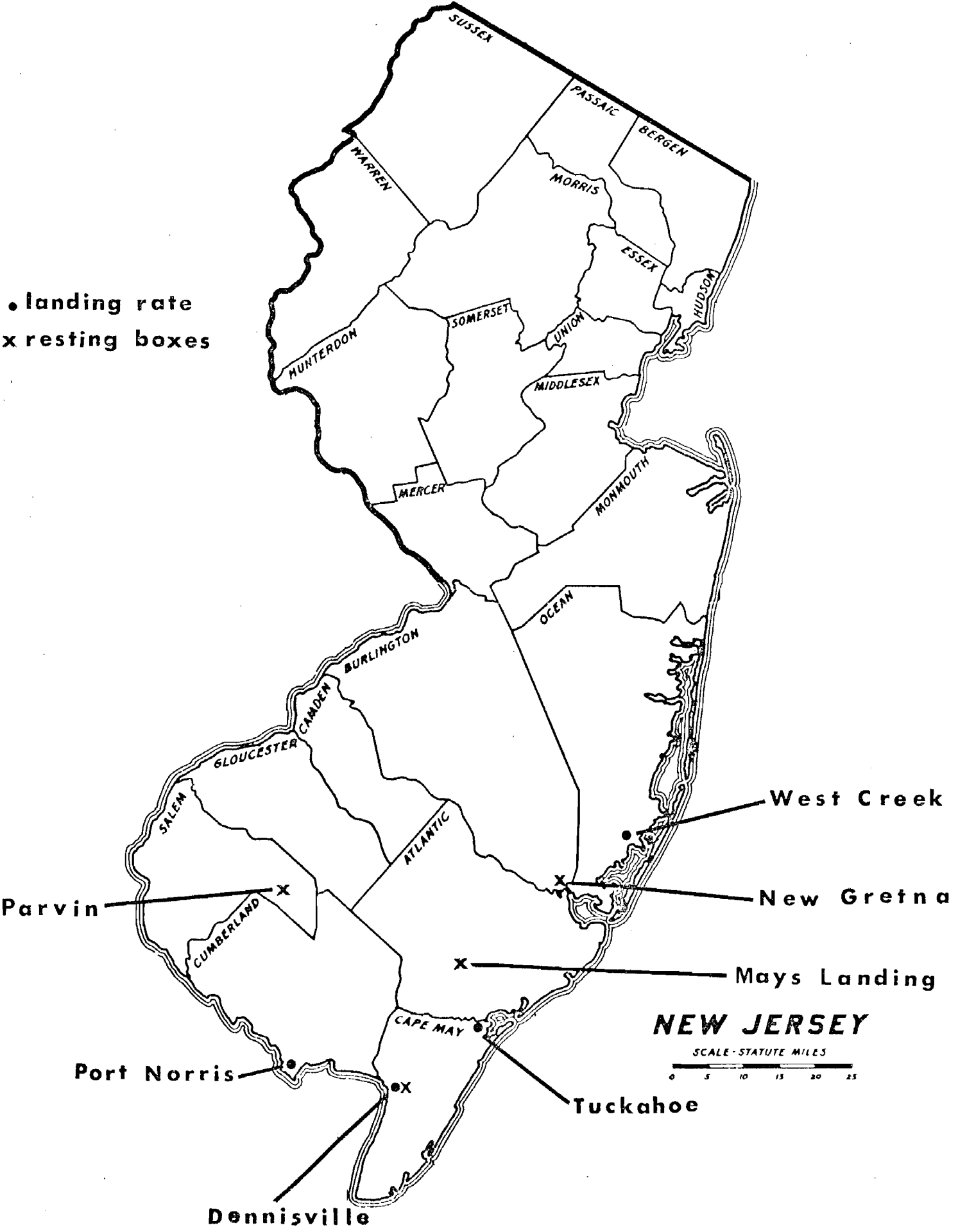
The real importance of these isolated records lies in the potential for another mosquito-borne arbovirus, western encephalitis. WE is common in wild birds in New Jersey and is frequently isolated from Cs. melanura. Most researchers feel that the virus has never been transmitted to humans because the epidemic vector, Culex tarsalis, is missing. Ae. sollicitans is an excellent vector of EE but a very poor one for WE. If Cx. tarsalis became established, WE might become a human problem in the State. The levels of resistance to pesticides that have been reported in some areas may be an even bigger problem.

New Jersey is fortunate to have mosquito control personnel that are able to recognize the unusual specimen and report the findings. Millions of mosquitoes are screened from the light trap collections in the various counties and the State Department of Health processes great quantities for their virus studies. Finding the single odd specimen is not an easy task. Following through with an identification (which requires special keys) represents a great deal of effort that is based on concern.

Follow up surveys will undoubtedly be undertaken in the area under question. The presence of a breeding population of Cx. tarsalis must be documented with data.

Study Sites

• landing rate
x resting boxes



Aedes sollicitans

SITE WEST CREEK

COUNTY Ocean

COLLECTION DATA

Date Aug. 15, 1977

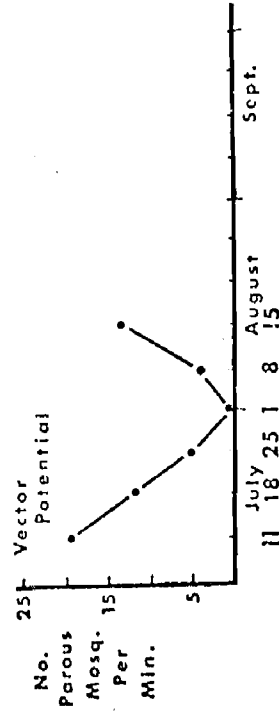
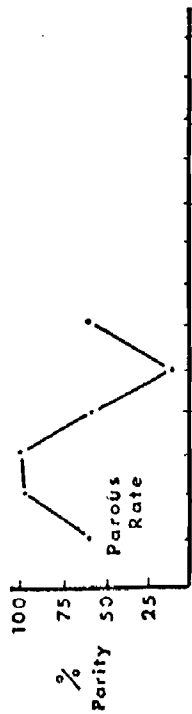
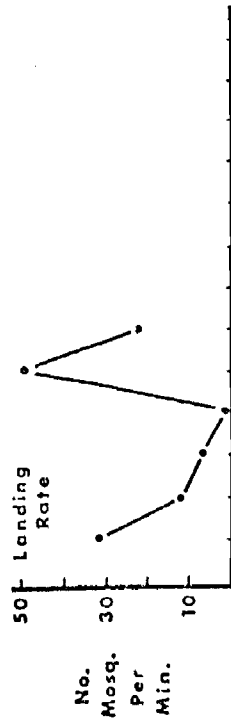
Landing Rate 22/min

Parous Rate 60%

Vector Potential 13.2
(Parous Landing Rate)

REMARKS: Landing rates are still high as a result of continued emergences but State Airsprays have kept parous rates and vector potential lower than surrounding areas.

CUMULATIVE RECORD



NOTES: 8460 Acres in the West Creeke area received a Dibrom+HAN State Airspray on August 10. 4000 Acres were retreated on Aug. 13 after fresh mosquitoes emerged from the surrounding marshlands. 100 Ae. sollicitans from this population were submitted for virus assay on August 15.

Aedes sollicitans

SITE TUCKAHOE

COUNTY Cape May

COLLECTION DATA

Date Aug. 15, 1977

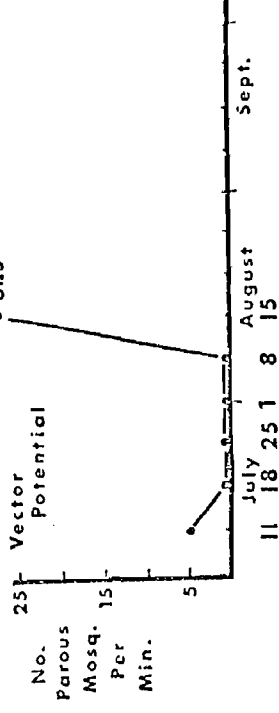
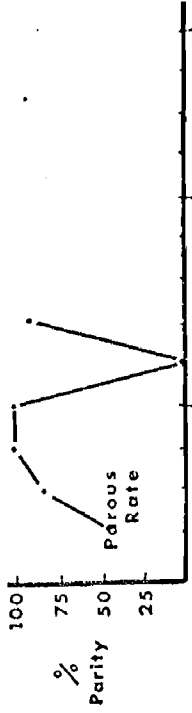
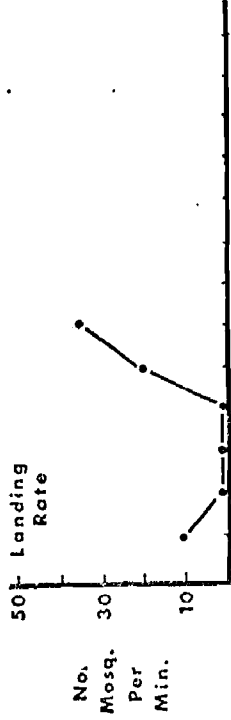
Landing Rate 35/min

Parous Rate 90%

Vector Potential 31.5
(Parous Landing Rate)

REMARKS: The vector potential of this population is the highest recorded in the 3 years that the system has been employed in these studies.

CUMULATIVE RECORD



NOTES: This population did not receive a State Airspray but 2500 acres in the vicinity of Ocean City was treated with Dibrom + HAN on August 11 to reduce landing rates which approached 75/min in some areas. 381 Ae. sollicitans from this population were submitted for virus assay on August 15.

Aedes sollicitans

SITE DENNISVILLE

COUNTY Cape May

COLLECTION DATA

Date Aug. 16, 1977

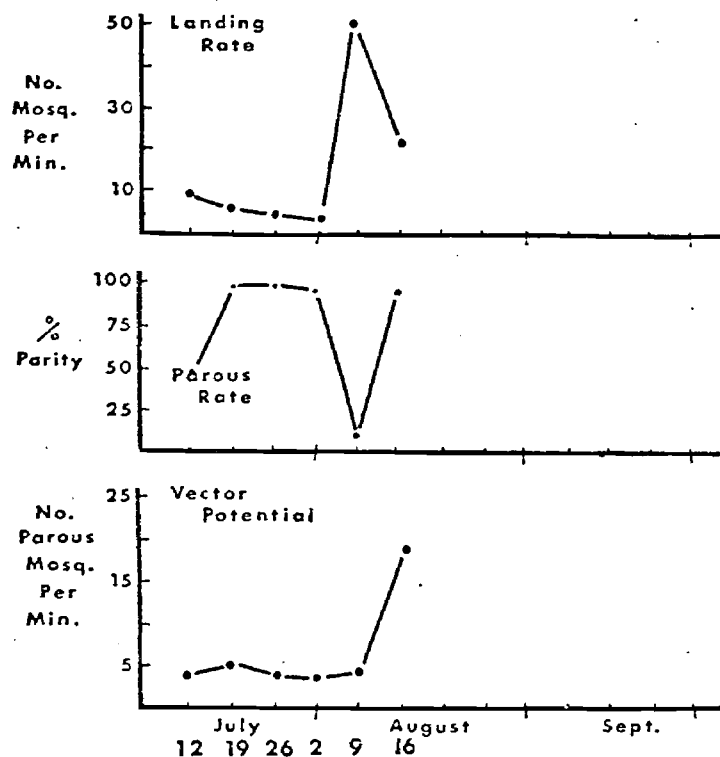
Landing Rate 20/min

Parous Rate 90%

Vector Potential 18
(Parous Landing Rate)

REMARKS: Vector potential is high in this area. Data do not indicate that any additional emergences have occurred since the main brood.

CUMULATIVE RECORD



NOTES: 2600 Acres in the Dennisville area received a Dibrom + HAN State Airspray on August 10. 100 *Ae. sollicitans* from this population were submitted for virus assay on August 16.

Aedes sollicitans

SITE PORT NORRIS

COUNTY Cumberland

COLLECTION DATA

Date Aug. 16, 1977

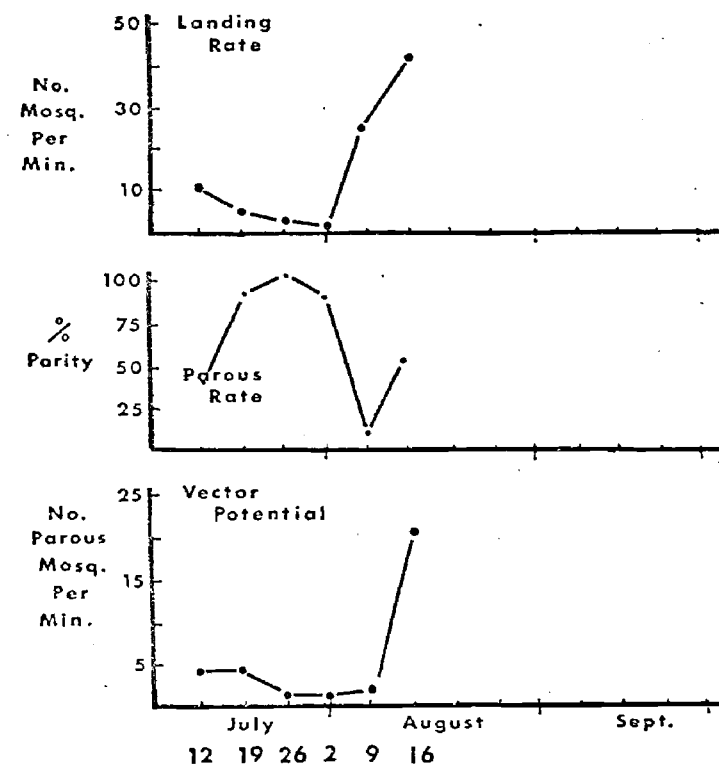
Landing Rate 40/min

Parous Rate 50%

Vector Potential 20
(Parous Landing Rate)

REMARKS: Data indicate that numerous fresh mosquitoes have emerged in this area since the airspray. Vector potential should rise rapidly over the next several days.

CUMULATIVE RECORD



NOTES: 3116 Acres in the Port Norris area received a Dibrom + HAN State Airspray on August 9. 175 *Ae. sollicitans* from this population were submitted for virus assay.

Culiseta melanura

SITE DENNISVILLE

COUNTY Cape May

COLLECTION DATA

Date Aug. 16, 1977

No. Boxes

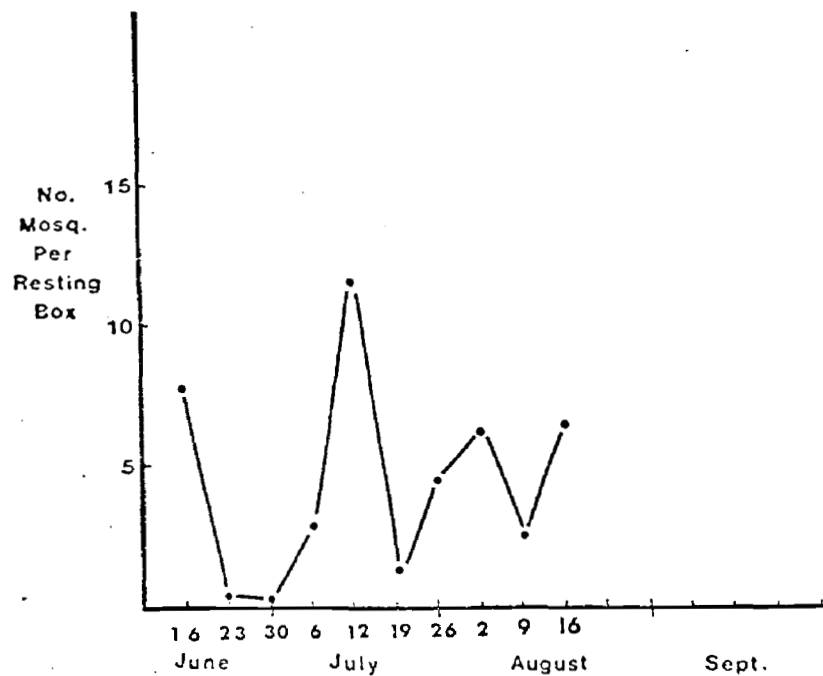
Examined: 25

Total C.mel. 160

C.mel./Box 6.4

REMARKS: Population appears to be building again. Numerous males in the boxes; parity recorded at 50%.

CUMULATIVE RECORD



NOTES: Submitted 40 blooded and 110 nonblooded Cs. melanura for virus assay.

Culiseta melanura

SITE PARVIN

COUNTY Salem

COLLECTION DATA

Date Aug. 16, 1977

No. Boxes

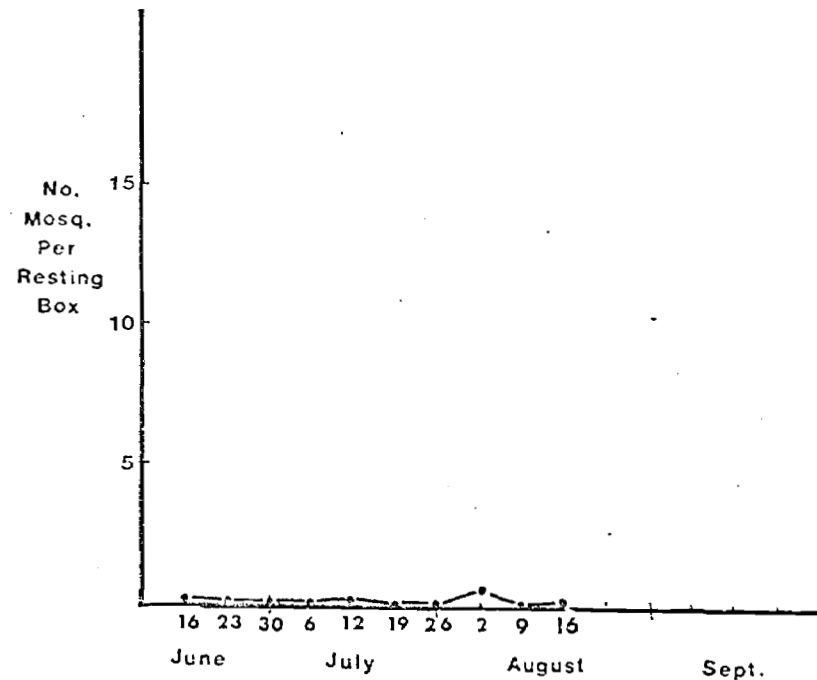
Examined: 20

Total C.mel. 2

C.mel./Box 0.1

REMARKS: Cs. melanura remains barely detectable at this site.

CUMULATIVE RECORD



NOTES: Submitted 2 blooded Cs. melanura for virus assay.

Culiseta melanura

SITE NEW GREYNA

COUNTY Burlington

COLLECTION DATA

Date Aug. 15, 1977

No. Boxes

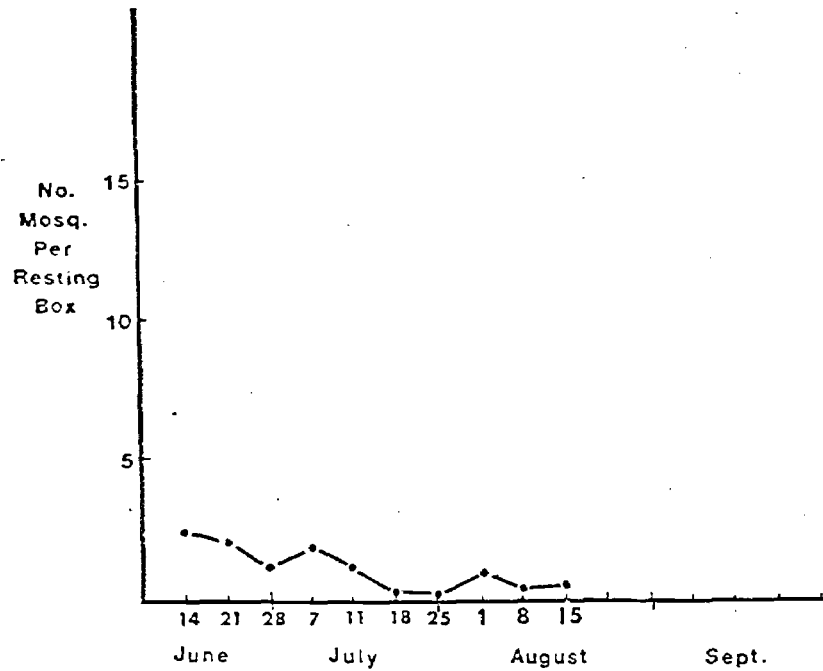
Examined: 24

Total C.mel. 12

C.mel./Box 0.5

REMARKS: Cs. melanura remains low in this area. The N. J. State Dept. of Health collected a single Culex tarsalis from these same resting boxes on August 12.

CUMULATIVE RECORD



NOTES: Submitted 4 blooded and 8 nonblooded Cs. melanura for virus assay.

Culiseta melanura

SITE MAYS LANDING

COUNTY Atlantic

COLLECTION DATA

Date Aug. 15, 1977

No. Boxes

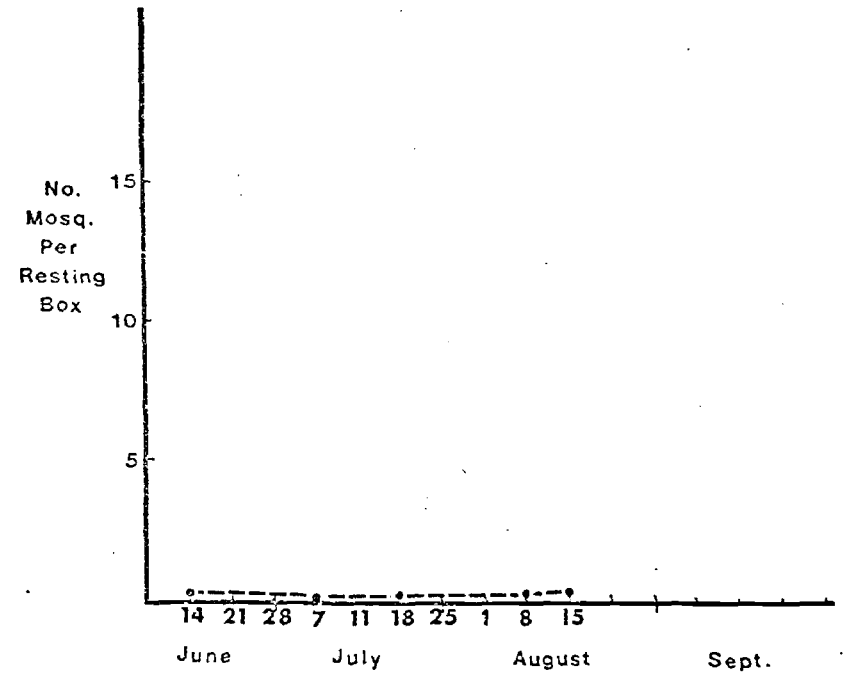
Examined: 19

Total C.mel. 0

C.mel./Box 0

REMARKS: No Cs. melanura in any of the resting boxes this week at this site.

CUMULATIVE RECORD



NOTES:

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

<u>Date Collected</u>	<u>Area</u>	<u>No. Tested</u>	<u>Initial Screening</u>	<u>Confirmation of Positive Pools</u>
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	Parvin	7 blooded	Negative	
8/08/77	New Gretna	5 blooded 3 nonblooded		
8/08/77	Mays Landing	3 nonblooded		
8/09/77	Dennisville	10 blooded 39 nonblooded		
8/15/77	Warren Grove	2 blooded 1 nonblooded		
8/15/77	New Gretna	4 blooded 8 nonblooded		
8/16/77	Dennisville	40 blooded 110 nonblooded		

Specimens Submitted for Virus Assay

Aedes sollicitans

<u>Date Collected</u>	<u>Area</u>	<u>No. Tested</u>	<u>Initial Screening</u>	<u>Confirmation of Positive Pools</u>
8/15/77	West Creek	100		
8/15/77	Tuckahoe	381		
8/16/77	Dennisville	100		
8/16/77	Port Norris	175		

List of Personnel:

Project Leader:	Wayne J. Crans
Surveillance Specialist:	Jere D. Downing
Mosquito Program Coordinator:	Anthony A. Di Edwardo
Mosquito Program Acting Director:	Harry D. Brown
State Airspray Program Director:	Donald J. Sutherland
Associate Mosquito Program Staff:	Bunnie Hajek Sherry Smith Robert Kent Noel Shubert Ned Jacobson Leon Blaustein
Cooperating Experiment Station Personnel:	David Tudor Otto Schwabe
Cooperating State Health Personnel:	Ronald Altman Walter Gusciora Oscar Sussman David Adams
State Health Associate Staff:	
Cooperating County Mosquito Control Superintendents:	Frederick Lesser, Ocean County Brian Gooley, Burlington County Judy Hansen, Cape May County Joseph Mason, Atlantic County Patrick Slavin, Cumberland County William Fisher, Salem County
State Mosquito Control Coordinator:	Kenneth W. Bruder
State Mosquito Control Commission:	Eleanore Renk Grant Walton Aaron Rappaport Theodore Czech Leonard Spiegel Benjamin Hiatt James Gaspari