

NEW JERSEY AGRICULTURAL EXPERIMENT STATION
MOSQUITO RESEARCH AND CONTROL

Vector Surveillance Report*

Vol. 3 No. 5

Period. Season Summation

Introduction

Cool nights and light frosts reduced the vector populations early in October and terminated the majority of virus activity in New Jersey. EE virus was still detectable in Cs. melanura in the southern portion of the state late in September. Collections from the Vector Surveillance Program were terminated on September 26, 1978, but the State Department of Health continued to monitor mosquitoes into October to follow the cycle in its final stages.

The 1978 season marked the first year that EE virus was active in New Jersey since Vector Surveillance monitoring was initiated. A number of events were documented this year which should be of value in predicting future activity. The timing of the events as they occurred in 1978 will be most important in assessing the potential for future outbreaks.

Summation of the Findings in 1978

The first indication that EE might be a problem in 1978 came from the Dominican Republic where epizootic activity and human involvement was documented in February and March. Health officials called for increased surveillance along the Atlantic Coast since outbreaks in the Caribbean region frequently serve as an indicator of potential cycling on the eastern seaboard of the U. S. later in the summer. Early monitoring in New Jersey showed that Cs. melanura populations were exceedingly high. In some areas of the state, mosquito commissions controlled Cs. melanura as early as June to lower the numbers in areas where EE had been a problem in the past.

The activity in the Caribbean region did prove to be an indicator, for EE was reported in the southern U. S. during May and June. Florida was the only state where the virus advanced beyond the avian cycle. Both equine and human cases were reported from Florida during the course of the year.

Cs. melanura populations remained well above normal in New Jersey throughout the summer months, but virus was not detectable in the mosquitoes until late July when WE, a virus of limited public health significance on the east coast, became epizootic at both of the study sites that were being monitored. EE was reported from New England at this time, but only WE was isolated from mosquitoes in New Jersey. Cs. melanura were repeatedly controlled at the Dennisville site during this period with only a short-term affect on the population. Throughout July and August, Cs. melanura remained approximately 10 times higher than populations recorded in the two previous years.

*Supported by the New Jersey State Mosquito Control Commission.

EE virus did reach New Jersey very late in August and monitoring showed that the virus was probably widely distributed in the State. September was a month of considerable epizootic activity with both WE and EE cycling in avians at both of the study sites. Neither virus passed beyond the avian cycle, although WE was isolated from Ae. sollicitans at a State Department of Health collection site in Burlington County and EE was detected in pheasants very late in the season.

Conclusions

The data accumulated in 1978 have been most valuable because information on the interactions among Cs. melanura, Ae. sollicitans and EE virus was documented over the course of an entire active season. The information is directly comparable to similar data gathered in years when EE was not present. The comparisons show that important interactions have been occurring each year which may directly affect the intensity of cycling and the eventual transmission beyond the avian cycle.

In 1976, both Cs. melanura and Ae. sollicitans showed an exceedingly high potential for late season transmission of arboviruses, but virus tests showed that EE was not present and no activity occurred. Vector populations, therefore, can be primed and ready for intensive transmission with little or no effect of public health significance in the absence of virus. In 1977, Ae. sollicitans demonstrated a high vector potential late in the season, but Cs. melanura were far below normal throughout the entire year. Even if virus had been detected, it is doubtful that the low Cs. melanura populations could have initiated sufficient epizootic activity to result in transfer beyond the avian cycle. In 1978, Cs. melanura demonstrated an exceedingly high vector potential throughout the year, but the virus appeared late and did not become amplified in avians until very late in the season. The vector potential of Ae. sollicitans was high prior to epizootic cycling, but declined markedly during the critical period. As a result, virus was amplified quickly, but did not pass beyond the avian cycle in the absence of an epidemic vector. The 1978 season, therefore, was a year of intensive virus activity, but with little impact on public health.

Eastern encephalitis transmission appears to rely on the interactions of the 3 major components, Cs. melanura, Ae. sollicitans and EE virus in birds. During 1978, natural factors reduced Ae. sollicitans during the critical period. Data suggest that vector control, in the form of reducing vector potential in late season populations of Ae. sollicitans, may be the key to the prevention of epidemic transmission in years when all of the factors are operating at peak efficiency.

Acknowledgments

The Vector Surveillance Program is grateful to the members of the State Mosquito Control Commission for the funds which supported this research activity in 1978. The Program also acknowledges the cooperation of the numerous mosquito control commissions which supported the investigation during the year. Any long-term surveillance program depends upon long range data to achieve its goal. The Vector Surveillance Program has enjoyed 3 full years of continuous cooperation.

Special thanks are due to the State Department of Health for the role they played in testing mosquito samples and making the data immediately available for reproduction and analysis. Dr. Ronald Altman, Dr. Bernard Taylor, Mr. David Adam and Mr. Walter Gusciora made a concerted effort to cooperate with the Vector Surveillance Program even though no funds were available for this important aspect of the study. The effort is appreciated by the New Jersey Agricultural Experiment Station and the State Mosquito Control Commission. The entire State of New Jersey has benefited from their expertise and participation.

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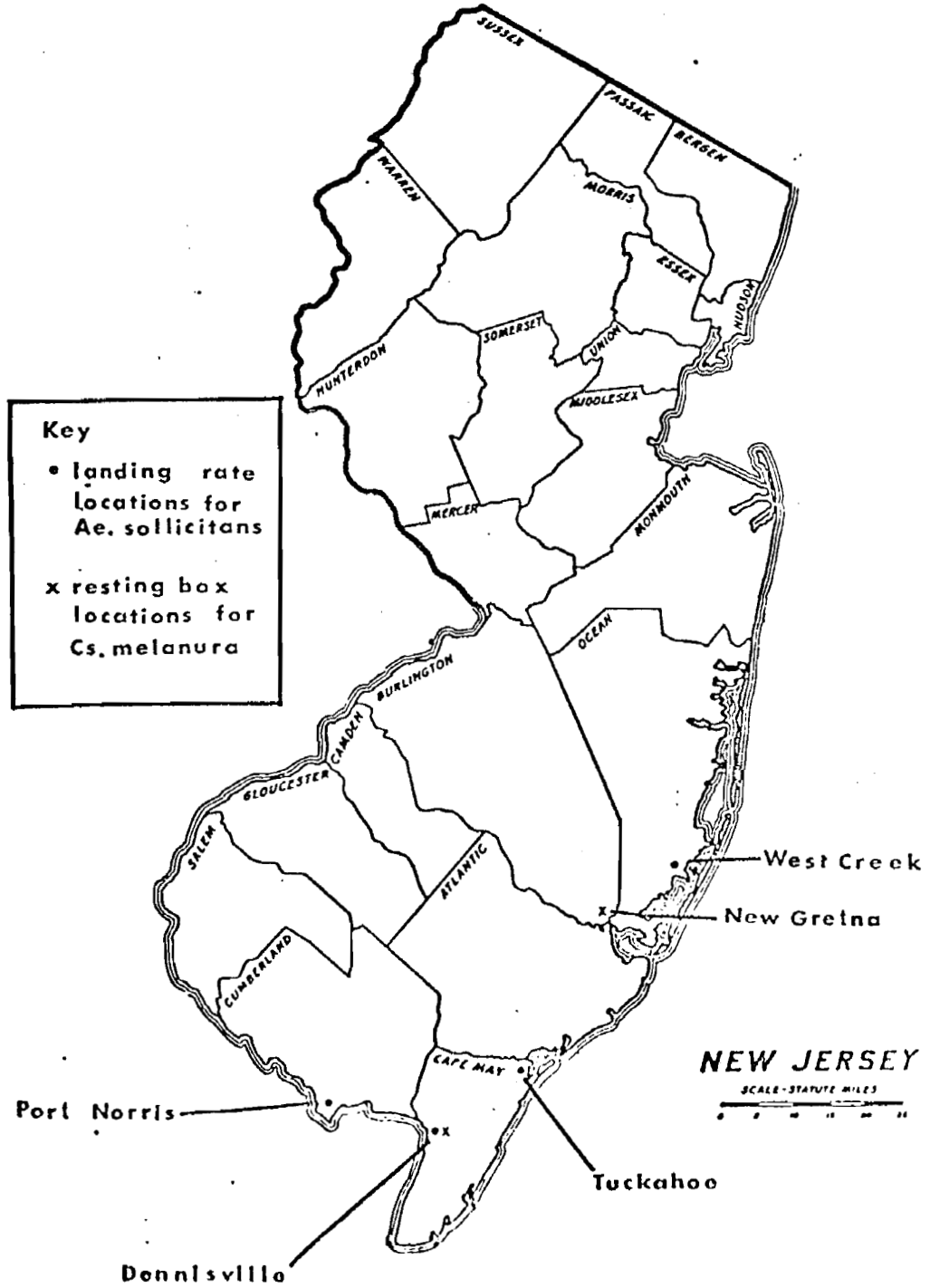
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Vector Surveillance

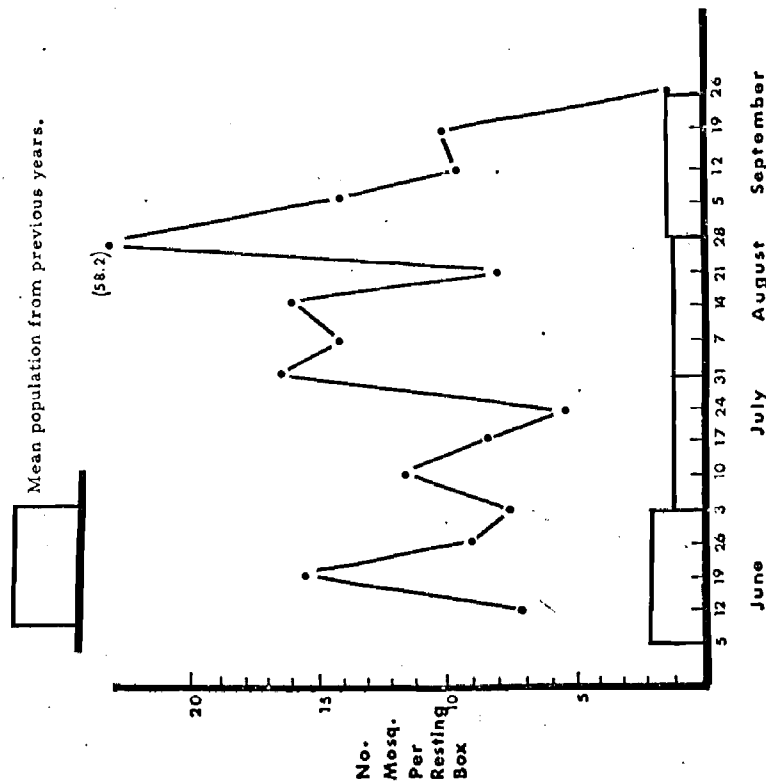
Study Sites



Culiseta melanura

SITE New Gretna
COUNTY Burlington

CUMULATIVE POPULATION RECORD

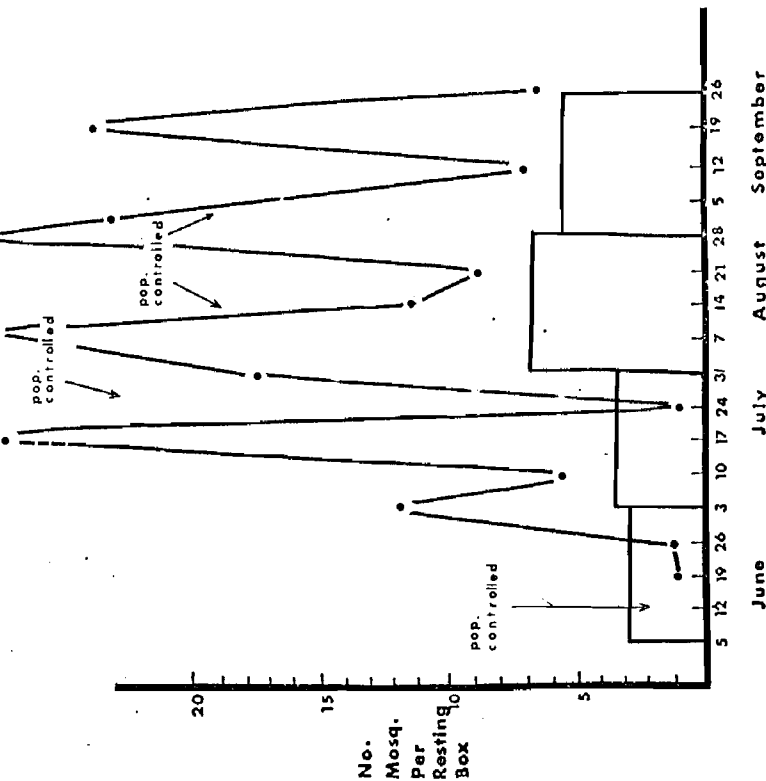


REMARKS: This population remained well above normal for the entire season. WE was epizootic from July 31 to Sept. 19. EE was active from Aug. 28 to Sept. 26.

Culiseta melanura

SITE Dennisville
COUNTY Cape May

CUMULATIVE POPULATION RECORD

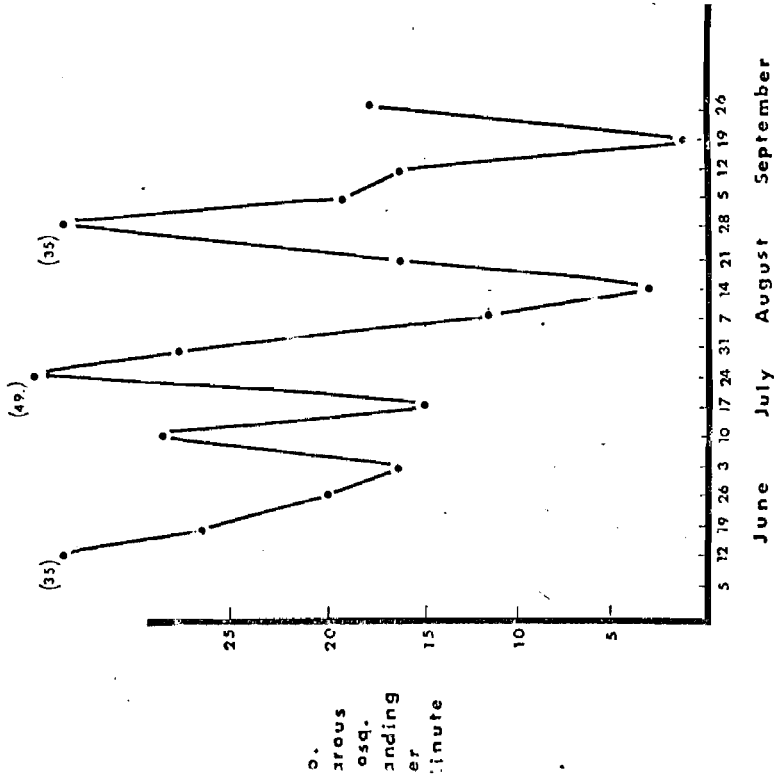


REMARKS: This population also remained above normal all season even though control was instituted on 4 separate occasions. WE was epizootic from Aug. 7 to Sept. 12. EE was active from Aug. 14 to Sept. 26.

Aedes sollicitans

SITE West Creek
COUNTY Ocean

CUMULATIVE VECTOR POTENTIAL RECORD

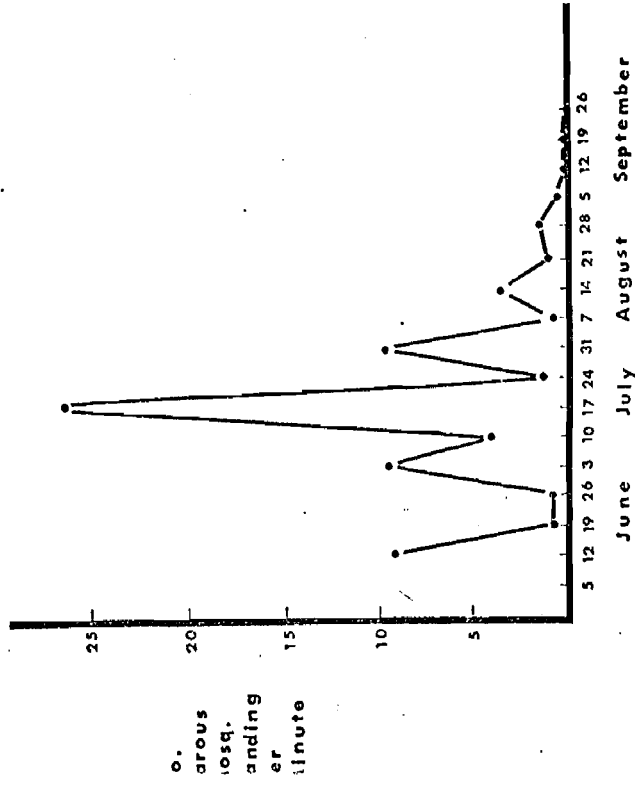


REMARKS: Vector potential was exceptionally high at this site during June, July and August with 3 definite peaks as result of 3 separate broods. Vector potential dropped during most of September and did not rise until late in the month after the 4th brood of the season began to age.

Aedes sollicitans

SITE Tuckahoe
COUNTY Cape May

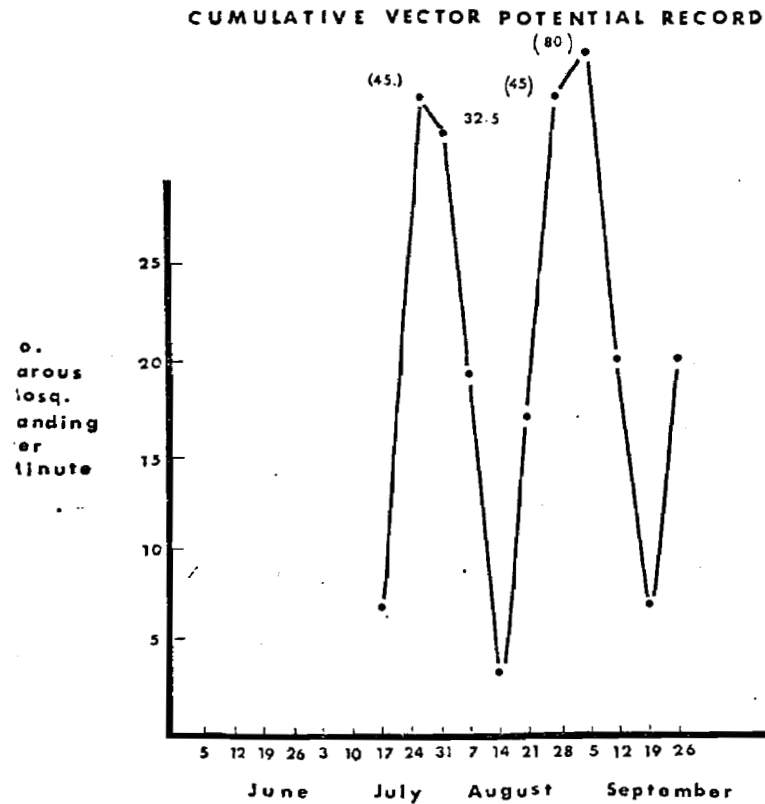
CUMULATIVE VECTOR POTENTIAL RECORD



REMARKS: Vector potential at this site was high in mid-July and exceptionally low for the rest of the season. During September, when EE was cycling, mosquitoes were all but absent.

Aedes sollicitans

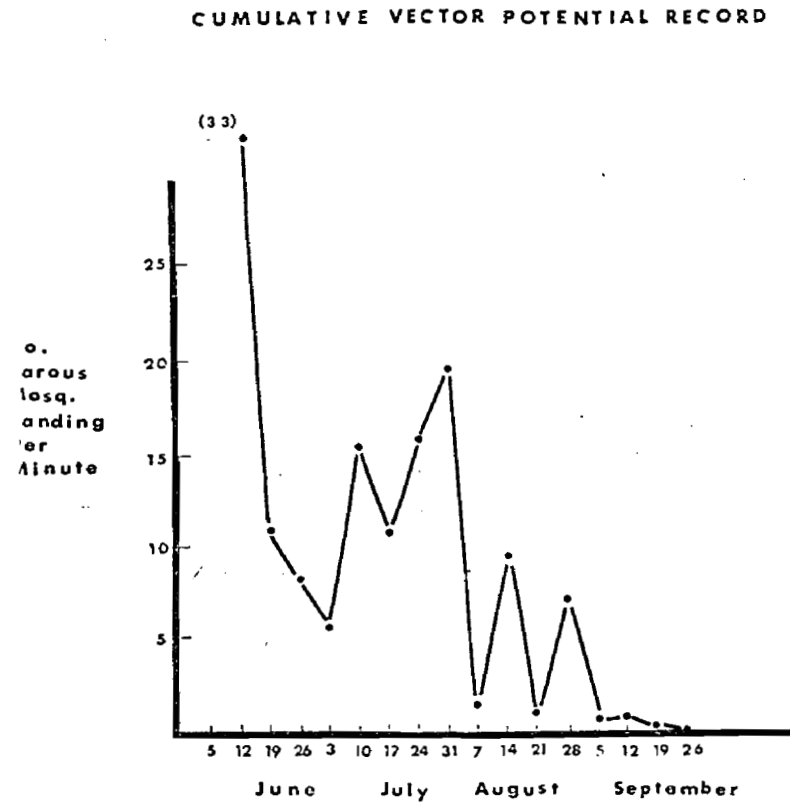
SITE Port Norris
COUNTY Cumberland



REMARKS: Vector potential was high at this site during most of the monitoring period. A noticeable drop occurred during September, the period when EE was active in other parts of the State.

Aedes sollicitans

SITE Dennisville
COUNTY Cape May



REMARKS: Vector potential at this site was very high in June and July and erratic in August. The absence of mosquitoes of sufficient age to transmit arboviruses in September may have been a major factor in keeping EE within the avian cycle, since EE was very active at this site late in the year.

Virus Data From the New Jersey State Department of Health

Culiseta melanura tested for EE Virus during 1978

Key: NG - New Gretna Study Site U - Unengorged specimens
 DV - Dennisville Study Site E - Engorged (blooded) specimens

Pool No.	Date Collected	Study Area	No. Tested	Initial Screening	Confirmation	Pool No.	Date Collected	Study Area	No. Tested	Initial Screening	Confirmation
1	6/12/78	N.G.	100-U	Neg		118	8/28/78	D.V.	100-U	Negative	
2	6/12/78	N.G.	120-U	Neg		119	8/28/78	D.V.	100-U	Negative	
3	6/12/78	N.G.	100-E	Neg		120	8/28/78	D.V.	100-U	Negative	
4	6/12/78	N.G.	44-E	Neg		121	8/28/78	D.V.	100-U	Negative	
5	6/19/78	N.G.	100-U	Neg		122	8/28/78	D.V.	100-U	Negative	
6	6/19/78	N.G.	100-U	Neg		123	8/28/78	D.V.	100-U	Positive	EE
7	6/19/78	N.G.	100-U	Neg		124	8/28/78	D.V.	100-U	Positive	EE
8	6/19/78	N.G.	112-U	Neg		125	8/28/78	D.V.	100-U	Positive	EE
9	6/19/78	N.G.	100-E	Neg		126	8/28/78	D.V.	100-U	Negative	
10	6/19/78	N.G.	100-E	Neg		127	8/28/78	D.V.	31-U	Negative	
11	6/19/78	N.G.	123-E	Neg		128	8/28/78	D.V.	100-E	Positive	EE
12	6/19/78	D.V.	15-U	Neg		129	8/28/78	D.V.	100-E	Negative	
13	6/19/78	D.V.	3-E	Neg		130	8/28/78	D.V.	100-E	Positive	EE
14	6/26/78	N.G.	100-U	Neg		131	8/28/78	D.V.	100-E	Positive	WE
15	6/26/78	N.G.	100-U	Neg		132	8/28/78	D.V.	82-E	Positive	EE
16	6/26/78	N.G.	72-U	Neg		133	8/28/78	N.G.	100-U	Negative	
17	6/26/78	N.G.	100-E	Neg		134	8/28/78	N.G.	100-U	Negative	
18	6/26/78	N.G.	35-E	Neg		135	8/28/78	N.G.	100-U	Positive	EE
19	6/26/78	D.V.	12-U	Neg		136	8/28/78	N.G.	100-U	Negative	
20	6/26/78	D.V.	11-E	Neg		137	8/28/78	N.G.	100-U	Negative	
21	7/06/78	D.V.	100-E	Neg		138	8/28/78	N.G.	100-U	Positive	WE
22	7/06/78	D.V.	95-E	Neg		139	8/28/78	N.G.	100-U	Negative	
23	7/06/78	D.V.	97-U	Neg		140	8/28/78	N.G.	100-U	Positive	WE
24	7/06/78	N.G.	100-E	Neg		141	8/28/78	N.G.	100-U	Positive	WE
25	7/06/78	N.G.	52-E	Neg		142	8/28/78	N.G.	100-U	Positive	WE
26	7/06/78	N.G.	100-U	Neg		143	8/28/78	N.G.	122-U	Negative	
27	7/06/78	N.G.	119-U	Neg		144	8/28/78	N.G.	34-U	Negative	
28	7/10/78	D.V.	100-E	Neg		145	8/28/78	N.G.	100-E	Negative	
29	7/10/78	D.V.	72-E	Neg		146	8/28/78	N.G.	100-E	Negative	
30	7/10/78	D.V.	49-U	Neg		147	8/28/78	N.G.	78-E	Positive	WE
31	7/10/78	N.G.	100-E	Neg		180	9/05/78	N.G.	100-U	Negative	
32	7/10/78	N.G.	42-E	Neg		181	9/05/78	N.G.	100-U	Negative	
33	7/10/78	N.G.	100-U	Neg		182	9/05/78	N.G.	100-U	Negative	
34	7/10/78	N.G.	100-U	Neg		183	9/05/78	N.G.	100-U	Positive	WE
35	7/10/78	N.G.	56-U	Neg		184	9/05/78	N.G.	38-U	Negative	
36	7/17/78	D.V.	100-U	Neg		185	9/05/78	N.G.	100-E	Negative	
37	7/17/78	D.V.	100-U	Neg		186	9/05/78	N.G.	29-E	Positive	WE
38	7/17/78	D.V.	100-U	Neg		187	9/05/78	D.V.	100-U	Negative	
39	7/17/78	D.V.	81-U	Neg		188	9/05/78	D.V.	100-U	Negative	
40	7/17/78	D.V.	100-E	Neg		189	9/05/78	D.V.	100-U	Positive	WE
41	7/17/78	D.V.	100-E	Neg		190	9/05/78	D.V.	114-U	Positive	WE
42	7/17/78	D.V.	55-E	Neg		191	9/05/78	D.V.	110-E	Negative	
43	7/17/78	N.G.	100-U	Neg		192	9/12/78	N.G.	192-U	Positive	WE
44	7/17/78	N.G.	45-U	Neg		193	9/12/78	N.G.	148-E	Positive	EE
45	7/17/78	N.G.	115-E	Neg		194	9/12/78	D.V.	121-U	Negative	
46	7/24/78	N.G.	90-U	Neg		195	9/12/78	D.V.	103-E	Positive	WE
47	7/24/78	N.G.	93-E	Neg		196	9/19/78	N.G.	100-U	Positive	WE
48	7/24/78	D.V.	7-U	Neg		197	9/19/78	N.G.	148-E	Positive	WE
49	7/24/78	D.V.	27-E	Neg		198	9/19/78	D.V.	200-U	Negative	
50	7/31/78	D.V.	100-U	Neg		199	9/19/78	D.V.	187-U	Positive	EE
51	7/31/78	D.V.	119-U	Neg		200	9/19/78	D.V.	100-U	Negative	
52	7/31/78	D.V.	100-E	Neg		201	9/19/78	D.V.	141-E	Negative	
53	7/31/78	D.V.	89-E	Neg		202	9/19/78	D.V.	100-E	Negative	
54	7/31/78	N.G.	125-U	Positive	WE	204	9/26/78	D.V.	100-U	Negative	
55	7/31/78	N.G.	119-U	Positive	WE	205	9/26/78	D.V.	78-U	Positive	EE
56	7/31/78	N.G.	100-E	Neg		206	9/26/78	D.V.	58-U	Positive	EE
57	7/31/78	N.G.	50-E	Neg		207	9/26/78	N.G.	61-U	Positive	EE
58	8/07/78	D.V.	100-U	Neg							
59	8/07/78	D.V.	100-U	Neg							
60	8/07/78	D.V.	100-U	Neg							
61	8/07/78	D.V.	100-U	Neg							
62	8/07/78	D.V.	100-U	Neg							
63	8/07/78	D.V.	103-U	Neg							
64	8/07/78	D.V.	100-E	Neg							
65	8/07/78	D.V.	100-E	Positive	WE						
66	8/07/78	D.V.	100-E	Positive	WE						
67	8/07/78	D.V.	100-E	Positive	WE						
68	8/07/78	D.V.	100-E	Neg							
69	8/07/78	D.V.	100-E	Neg							
70	8/07/78	D.V.	48-E	Neg							
71	8/07/78	N.G.	100-U	Positive	WE						
72	8/07/78	N.G.	59-U	Positive	WE						
73	8/07/78	N.G.	100-E	Positive	WE						
74	8/07/78	N.G.	91-E	Positive	WE						
75	8/14/78	N.G.	100-U	Neg							
76	8/14/78	N.G.	115-U	Neg							
77	8/14/78	N.G.	100-E	Neg							
78	8/14/78	N.G.	48-E	Positive	WE						
79	8/14/78	D.V.	100-U	Neg							
80	8/14/78	D.V.	47-U	Positive	EE						
81	8/14/78	D.V.	114-E	Positive	WE						
82	8/21/78	N.G.	100-U	Negative							
83	8/21/78	N.G.	100-U	Positive	WE						
84	8/21/78	N.G.	87-U	Positive	WE						
85	8/21/78	N.G.	58-E	Negative							
86	8/21/78	D.V.	100-U	Negative							
87	8/21/78	D.V.	55-U	Negative							
88	8/21/78	D.V.	76-E	Negative							
111	8/28/78	D.V.	100-U	Negative							
112	8/28/78	D.V.	100-U	Negative							
113	8/28/78	D.V.	100-U	Negative							
114	8/28/78	D.V.	100-U	Negative							
115	8/28/78	D.V.	100-U	Negative							
116	8/28/78	D.V.	100-U	Negative							
117	8/28/78	D.V.	100-U	Negative							

Virus Data From the New Jersey State Department of Health

Aedes sollicitans tested for EE Virus during 1978

Key:

WC - West Creek
 PN - Port Norris
 LP - Leeds Point

T - Tuckahoe
 E - Eldora
 DV - Dennisville

E - Engorged (blooded) specimens
 U - Unengorged specimens

<u>Pool No.</u>	<u>Date Collected</u>	<u>Study Area</u>	<u>No. Tested</u>	<u>Initial Screening</u>	<u>Confirmation</u>
89	8/18/78	W. C.	100-U	NEGATIVE	
90	8/18/78	W. C.	100-U		
91	8/18/78	W. C.	100-U		
92	8/18/78	W. C.	100-U		
93	8/18/78	W. C.	100-U		
94	8/18/78	W. C.	100-U		
95	8/18/78	W. C.	100-U		
96	8/18/78	W. C.	100-U		
97	8/18/78	W. C.	104-U		
98	8/18/78	T	100-U		
99	8/18/78	T	77-U		
100	8/21/78	P. N.	100-U		
101	8/21/78	P. N.	100-U		
102	8/21/78	P. N.	69-U		
103	8/22/78	W. C.	100-U		
104	8/22/78	W. C.	100-U		
105	8/22/78	W. C.	125-U		
106	8/22/78	L. P.	80-U		
107	8/22/78	T	66-U		
108	8/22/78	D. V.	53-U		
109	8/22/78	E	55-U		
110	8/22/78	L. P.	24-U		
148	8/29/78	W. C.	100-U		
149	8/29/78	W. C.	100-U		
150	8/29/78	W. C.	109-U		
151	8/29/78	L. P.	100-U		
152	8/29/78	L. P.	61-U		
153	8/29/78	T	55-U		
154	8/29/78	D. V.	60-U		
155	8/29/78	E	31-U		
156	8/25/78	T	49-U		
157	8/25/78	P. N.	100-U		
158	8/25/78	P. N.	82-U		
159	8/25/78	P. N.	2-U		
160	8/25/78	W. C.	100-U		
161	8/25/78	W. C.	100-U		
162	8/25/78	W. C.	89-U		
163	8/25/78	W. C.	14-E		
164	8/25/78	D. V.	64-U		
165	8/28/78	W. C.	115-U		
166	8/28/78	W. C.	5-E		
167	8/28/78	T	37-U		
168	8/28/78	T	1-E		
169	8/28/78	D. V.	66-U		
170	8/28/78	D. V.	1-E		
171	8/28/78	P. N.	100-U		
172	8/28/78	P. N.	56-U		
173	9/04/78	W. C.	125-U		
174	9/04/78	L. P.	50-U		
175	9/04/78	L. P.	21-U		
176	9/04/78	D. V.	18-U		
177	9/04/78	E	18-U		
178	9/04/78	P. N.	100-U		
179	9/04/78	P. N.	46-U		
203	9/19/78	W. C.	102-U		