



NEW JERSEY
DEPARTMENT OF AGRICULTURE



NEW JERSEY VECTOR SURVEILLANCE

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ABSTRACT: *Culiseta melanura* populations increased markedly during the month of August and reached record levels in most areas of New Jersey during the latter part of the season. EEE virus appeared in *Cs. melanura* in mid-July and Minimum Field Infection Rates (MFIR) were extremely high during August at most of the study sites that are being monitored for virus. A confirmed equine case from Camden County in early August signaled that epizootic transmission was taking place on the inner coastal plain of the State. During August and September, 6 equine cases were confirmed by isolation of EEE virus from brain tissue. Six additional equine cases were diagnosed by serology and listed as presumptive. A possible human case was investigated from the Ocean City area of Cape May County during early August. Epidemiological data suggest that the area was at high risk during the period of onset but no serological data were obtained to make a positive diagnosis.

INTRODUCTION

New Jersey experienced record rainfall during most of the Summer and mosquito populations were extremely high in all areas of the State. Light trap records from County Mosquito Control Commissions showed that floodwater species were present at record levels in most areas. Multiple broods of salt marsh mosquitoes were produced by the combination of rains and tides along the coast. As the Summer advanced, intermittent rains continued to plague the State and repeated aerial treatment was needed along the coast to reduce the nuisance being created by the large salt marsh broods. By mid-summer, most mosquito commissions had used up the emergency funds they had requested earlier in the season and were forced to seek additional supplemental appropriations as the encephalitis season approached.

THE CURRENT STATUS OF EEE

Culiseta melanura populations were slow to respond to the early season habitat created by the Spring rains but increased markedly as the season advanced. During the months of July and August the species expanded its range considerably and was represented in light trap collections from areas where the species had never before been recorded. EEE virus first appeared in *Cs. melanura* during mid-July and MFIR values increased as the season advanced. Epizootic transmission was evident by early August and new equine cases were still being investigated in the early portion of October. Data from the resting box collection sites (Fig. 1) indicated that *Cs. melanura* populations were at the highest levels ever recorded at virtually all of the sites during the month of August.

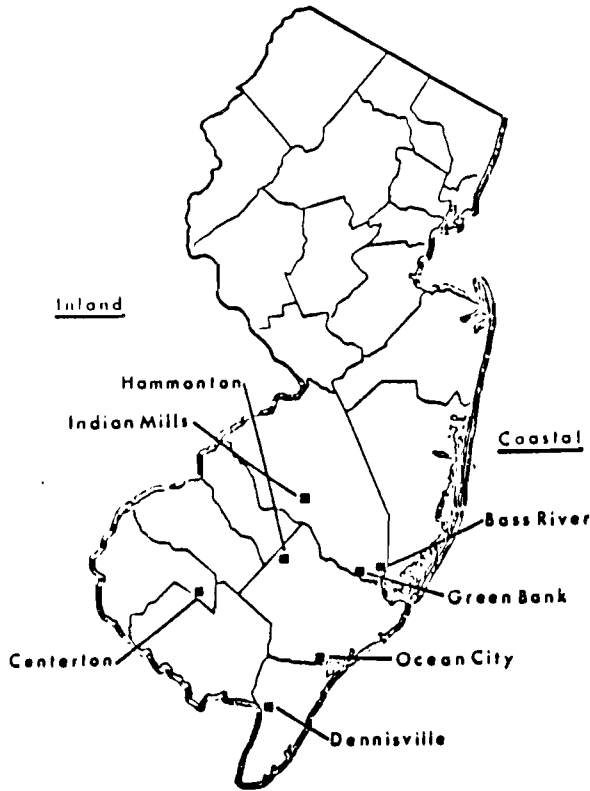


Fig. 1. Resting box sites for arbovirus surveillance in 1989.

The rising population trend started in late July and extended well into the month of September. Figure 2 compares the 1989 populations of *Cs. melanura* at the

Dennisville site with the 12 year mean for that area. The data clearly show that the species was well above average all summer long. During most of the period, the weekly collections were more than double the expected counts and in many cases the counts were as much as 4-5 fold above the average. Data from other sites showed that high *Cs. melanura* populations were state-wide. Virtually all of the other sites being monitored for EEE showed a similar population trend and record high collections were the norm during most of the Summer.

RESULTS OF VIRUS TESTING

The high mosquito populations this year has resulted in a backlog of specimens and virus tests have only been received for specimens collected through August 22. During that period approximately 23,000 specimens were processed and tested for EEE and HJ virus (Table 1). *Culiseta melanura* was the only species to yield virus with 34 EEE and 17 HJ isolations.

Table 2 compares the MFIR values (isolations per 1000 specimens tested) for July and August at each of the sites that are being monitored. EEE virus appeared first at the Green Bank site on July 18.

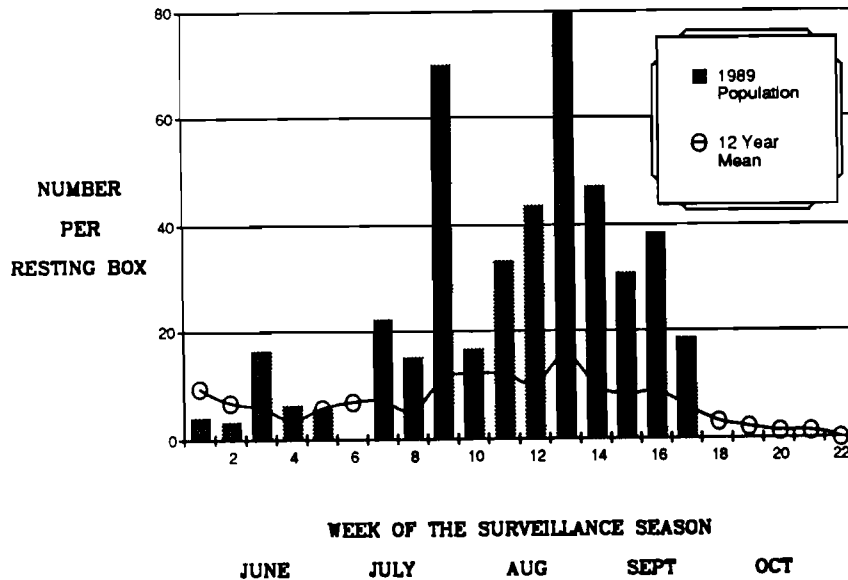


Fig. 2. Resting box populations of *Cs. melanura* at Dennisville in Cape May County during 1989.

Three additional isolations were obtained from that site during July. Single EEE isolations were obtained during July from Bass River, Ocean City and Dennisville. During the month of August, the MFIR was extremely high at the 2 sites along the Atlantic coast, Bass River and Ocean City. Data suggest that the risk for transmission to humans was probably greatest in that region this year.

EQUINE CASES OF EEE

The first equine case of EEE was confirmed by the New Jersey Department of Agriculture from a yearling quarterhorse stabled near the town of Waterford Works in the western portion of Camden County. Since that time, a total of 6 cases have been confirmed by isolation of virus from brain

tissue. An additional 6 have been listed as presumptive on the basis of blood serology. Table 3 lists the cases that have been investigated to date, together with the diagnoses. All of the equine cases have occurred within the inland zone of the coastal plain where EEE in equines has been most common.

DISCUSSION

In view of the extremely high levels of *Cs. melanura* and the MFIR values that have been detected to date, the number of documented horse cases would appear to be low. Under similar circumstances in past years, 20 or more equine cases have followed abrupt epornitic activity in *Cs. melanura*. Moreover, the size of the *Cs. melanura* populations this year have not been matched in any of the years where

Table 1. Mosquito species tested for EEE and HJ virus through August 22, 1989.

MOSQUITO SPECIES	TOTAL TESTED	NO. POOLS	POSITIVE POOLS	
			HJ	EEE
Genus <i>Culiseta</i>				
<i>Cs. melanura</i>	15311	576	17	34
Genus <i>Aedes</i>				
<i>Ae. canadensis</i>	126	26	0	0
<i>Ae. cantator</i>	5	5	0	0
<i>Ae. grossbecki</i>	1	1	0	0
<i>Ae. hendersoni</i>	37	4	0	0
<i>Ae. sollicitans</i>	1	1	0	0
<i>Ae. thibaulti</i>	33	13	0	0
<i>Ae. triseriatus</i>	49	5	0	0
<i>Ae. trivittatus</i>	2	2	0	0
<i>Ae. vexans</i>	13	10	0	0
Genus <i>Anopheles</i>				
<i>An. bradleyi</i>	43	22	0	0
<i>An. punctipennis</i>	72	47	0	0
<i>An. quadrimaculatus</i>	6304	128	0	0
Genus <i>Coquilleidia</i>				
<i>Cq. perturbans</i>	14	10	0	0
Genus <i>Culex</i>				
<i>Cx. pipiens</i>	12	11	0	0
<i>Cx. restuans</i>	669	146	0	0
<i>Cx. salinarius</i>	147	35	0	0
<i>Cx. territans</i>	164	58	0	0
Genus <i>Psorophora</i>				
<i>Ps. ferox</i>	2	2	0	0

virus activity has been monitored near the inland sites. The reasons for the lack of more active transfer to horses are not known. It is possible that equine vaccination is more widely practiced as a result of the epizootics of 1984 and 1987. However, the only proven vector of EEE to horses, *Coquillettidia perturbans*, has been extremely low this year. It is, therefore, possible that New Jersey is experiencing a year of severe amplification of EEE virus in the absence of suitable epizootic vectors.

In early August, the New Jersey State Department of Health investigated a possible human case of EEE in a 5 yr-old female who lived in Cherry Hill, Camden County and vacationed at the shore at Ocean City in Cape May County from July 29 to August 5. The child developed CNS symptoms on August 4 and died 3 days

later. The parents refused autopsy but serum and spinal fluid was sent to CDC. The samples tested negative and the diagnosis is considered as possible EEE based on symptomology.

That case is almost an exact replicate of the 1984 case where a young girl from Massachusetts visited Ocean City in early August and apparently contracted EEE during the visit. Preliminary investigations in that area detected high levels of EEE in *Cs. melanura* and resulted in the establishment of the Ocean City study site in the drainage of the Great Egg Harbor River. Data from the Ocean City site show that *Cs. melanura* populations were again extremely high this year (Fig. 3) and that EEE was present in the population prior to onset of the case. The MFIR values for Ocean City (Table 3) duplicate those found in 1984 when

Table 2. Minimum Field Infection Rates in *Cs. melanura* during July and August, 1989

LOCATION	TOTAL TESTED	NO. POOLS	POSITIVE EEE	MFIR VALUE
JULY VALUES				
Coastal Sites				
Green Bank	704	22	4	5.68
Bass River	418	21	1	2.39
Ocean City	152	10	1	6.58
Dennisville	1334	35	1	0.75
Inland Sites				
Hammonton	1261	37	0	0.00
Indian Mills	104	13	0	0.00
Centerton	865	69	0	0.00
AUGUST VALUES				
Coastal Sites				
Green Bank	1140	302	4	3.51
Bass River	9438	26	7	7.42
Ocean City	447	21	4	8.95
Dennisville	3906	85	10	2.56
Inland Sites				
Hammonton	573	21	2	3.49
Indian Mills	72	14	0	0.00
Centerton	407	34	0	0.00

Table 3. Equine cases of EEE investigated in New Jersey during 1989.¹

ONSET	TOWN	COUNTY	DESCRIPTION	STATUS
Aug 10	Waterford Works	Camden	Quarterhorse Yearling	CONFIRMED
Aug 23	South Egg Harbor	Atlantic	1 year-old Pony	CONFIRMED
Aug 23	Vineland	Cumberland	4 year-old Pony	CONFIRMED
Aug 23	Vineland	Cumberland	5 month-old Thoroughbred	CONFIRMED
Aug 28	Buena	Atlantic	3 year-old Quarterhorse	PRESUMPTIVE
Sep 12	Bridgeport	Gloucester	Adult Quarterhorse	CONFIRMED
Sep 21	Sicklerville	Camden	1 year-old Quarterhorse	PRESUMPTIVE
Sep 23	Salem	Salem	6 month old Standardbred	CONFIRMED
Sep 23	Mays Landing	Atlantic	25 year-old Grade mare	PENDING
Sep 24	Franklinville	Gloucester	No info avail	PRESUMPTIVE
Sep 24	Sicklerville	Camden	6 month old Grade horse	PRESUMPTIVE
Sep 25	Cedar Brook	Camden	12 year-old Grade horse	PRESUMPTIVE
Sep 29	Sicklerville	Camden	4 year-old Pony	PENDING
Sep 30	Pedricktown	Salem	6 year-old Grade Horse	PRESUMPTIVE

¹ Information supplied by the State Departments of Agriculture and Health

the study site was first established. The data certainly indicate that the Ocean City area along the Atlantic coast was an area of high risk for possible transmission to humans this year.

County Mosquito Control Agencies of Atlantic, Burlington, Cape May, Camden, Cumberland, Gloucester, Ocean, Middlesex and Salem Counties.

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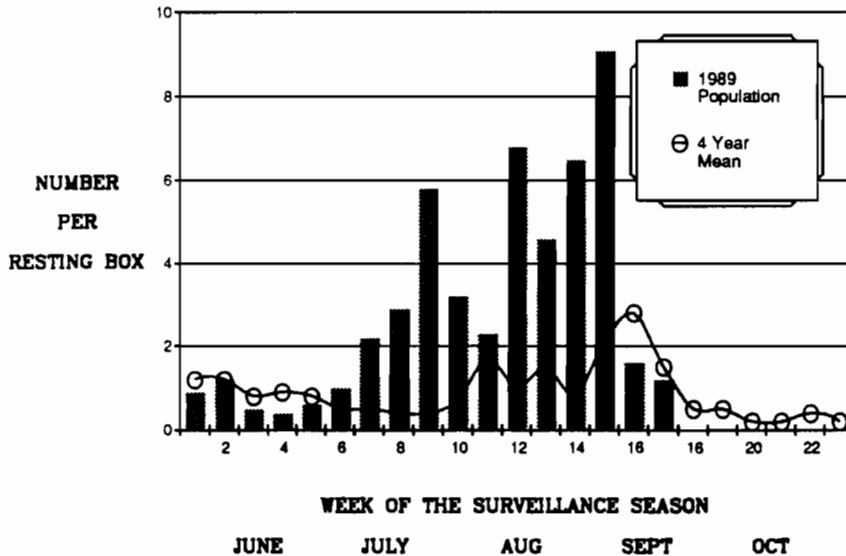


Fig. 3. Resting box populations of *Cs. melanura* at Ocean City (Corbin City site) in Atlantic County during 1989.