



NEW JERSEY
DEPARTMENT OF AGRICULTURE



NEW JERSEY VECTOR SURVEILLANCE

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ABSTRACT: New Jersey experienced early season virus amplification by *Culiseta melanura* in 1990 but Minimum Field Infection Rates (MFIR) declined as the season advanced. *Culiseta melanura* populations remained relatively low at most sites compared to the long term averages that have been compiled over the years. Despite the lack of virus in *Cs. melanura* and any signs of high level epornitic transmission, 9 equine cases were reported by the New Jersey Department of Agriculture. Most of the cases were reported from areas of the State where equine cases have been common. A focus of equine involvement in Monmouth County, however, points to the need to extend the EEE surveillance effort northward in 1991.

INTRODUCTION

Eastern equine encephalitis virus (EEE) caused national concern early in the season when a number of coastal states reported higher than average early season isolations from *Culiseta melanura*. As the season progressed, human cases were reported from Florida, North and South Carolina, Virginia and Massachusetts. New Jersey experienced early season isolations from *Cs. melanura*, as well as equine cases, but the epizootic did not intensify as the season progressed. As a result, EEE activity in New Jersey was relatively typical in 1990, producing 9 documented equine cases with no known human involvement.

The New Jersey Vector Surveillance Program was hindered by the Governor's budget message in 1990 which threatened to cut all funding for encephalitis monitoring as well as the funding for the State Airspray Program. The funds were eventually restored but the Vector Surveillance Program was forced to operate at a reduced level. The Program began the season with no funding and only 2 sites were included in

the surveillance effort (Ocean City monitored by Atlantic Co. personnel and Dennisville monitored by Cape May Co. personnel). After the restoration of funds was official, the program had problems finding field technicians to do the work because the people that had been hired were released to find other employment during the period of budget crisis. EEE virus and its mosquito vectors were eventually monitored at a reduced level during the 1990 season at 5 locations where EEE activity has been reported in the past. This report chronicles the events that took place in New Jersey as the 1990 epizootic progressed.

METHODOLOGY OF THE SURVEILLANCE EFFORT

The epornitic vector, *Cs. melanura*, was monitored with resting boxes at 5 collection stations in southern New Jersey. The Dennisville and Ocean City study sites were monitored from late May to early October. The Bass River, Hammonton and Centerton sites were monitored from mid-July to early

October. Collections were made once weekly during the surveillance period. Mosquito specimens were frozen on dry ice at each collection site and transported to Rutgers University for speciation, pooling and trituration.

In 1990, the Green Bank and Indian Mills study sites were dropped from the program. Resting boxes were the only monitoring tool used and, to conserve funds, *Cs. melanura* was the only mosquito species tested for virus until equine cases resulted in CDC collections from several new sites in Monmouth County where EEE had been confirmed as the cause of horse deaths late in the season. Virus isolation attempts were conducted by the New Jersey State Department of Health Laboratories in Trenton this year on a contract basis. Data were collated with a database system for rapid analysis and the information was distributed to county mosquito control agencies in the State throughout the encephalitis season.

MOSQUITO SPECIES TESTED FOR VIRUS DURING 1989

A total of 11,749 mosquito specimens were tested for Highlands J (HJ) and EEE virus during 1990 (Table 1). *Cs. melanura* comprised the overwhelming majority of the sample only because the species was being selected for in the protocol adopted for 1990. A total of 12 HJ and 38 EEE isolations were made during the season.

THE POPULATION DYNAMICS OF *CS. MELANURA* IN 1989

The status of early season populations of *Cs. melanura* was not available for most of the study sites but data from Ocean City and Dennisville suggest average levels compared to the long term mean. In July, *Culiseta melanura* populations showed an abrupt increase at Bass River (Fig. 1) and moderate increase at Ocean City (Fig 2). All of the other sites remained at or below the long term averages for the month of July. EEE virus, however, appeared early at most of the study sites (see discussion regarding

Table 1. Mosquito species tested for EEE and HJ virus in New Jersey during 1990.

MOSQUITO SPECIES	TOTAL TESTED	NO. POOLS	POSITIVE POOLS	
			HJ	EEE
<i>Genus Culiseta</i>				
<i>Cs. melanura</i>	11676	391	12	38
<i>Genus Aedes</i>				
<i>Ae. canadensis</i>	48	11	0	0
<i>Ae. sollicitans</i>	1	1	0	0
<i>Ae. triseriatus</i>	1	1	0	0
<i>Ae. vexans</i>	4	2	0	0
<i>Genus Anopheles</i>				
<i>An. punctipennis</i>	3	1	0	0
<i>An. quadrimaculatus</i>	1	1	0	0
<i>Genus Coquillettidia</i>				
<i>Cq. perturbans</i>	2	2	0	0
<i>Genus Culex</i>				
<i>Cx. pipiens</i>	1	1	0	0
<i>Cx. restuans</i>	4	3	0	0
<i>Cx. salinarius</i>	7	4	0	0
<i>Cx. territans</i>	1	1	0	0

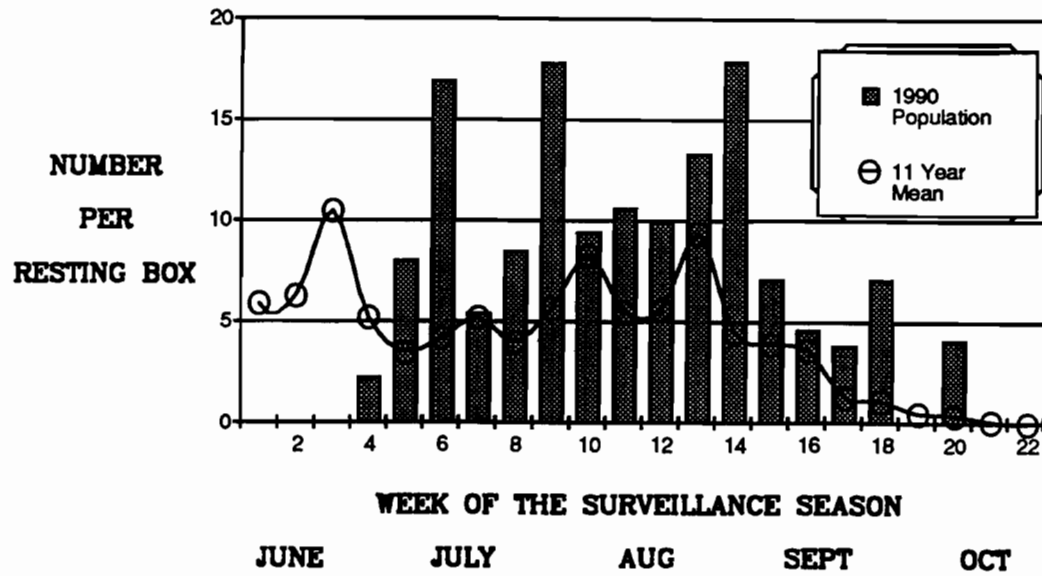


Fig. 1. Resting box populations of *Cs. melanura* at the Bass River site in Burlington County during 1990.

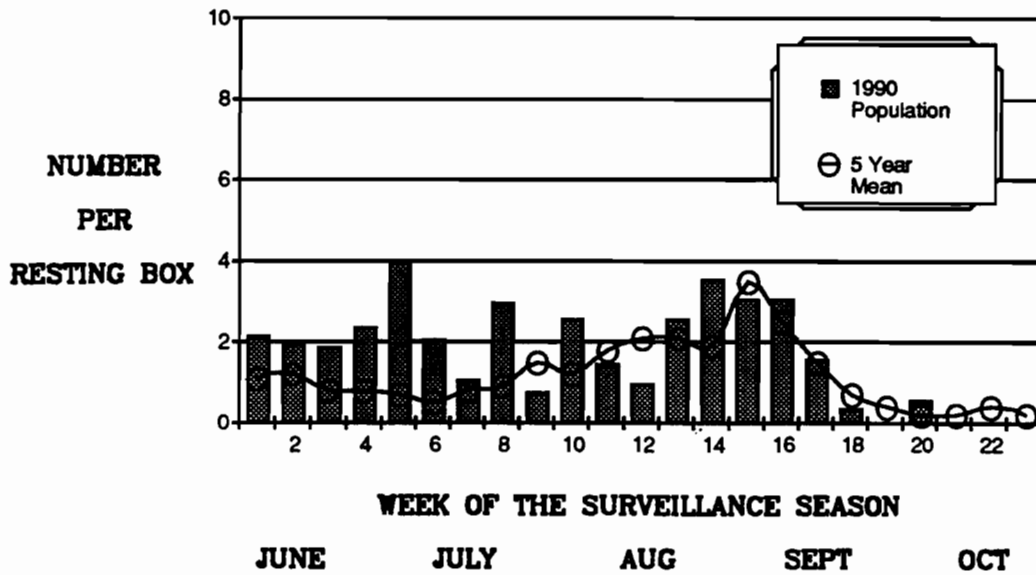


Fig. 2. Resting box populations of *Cs. melanura* at the Ocean City site in Atlantic County during 1990.

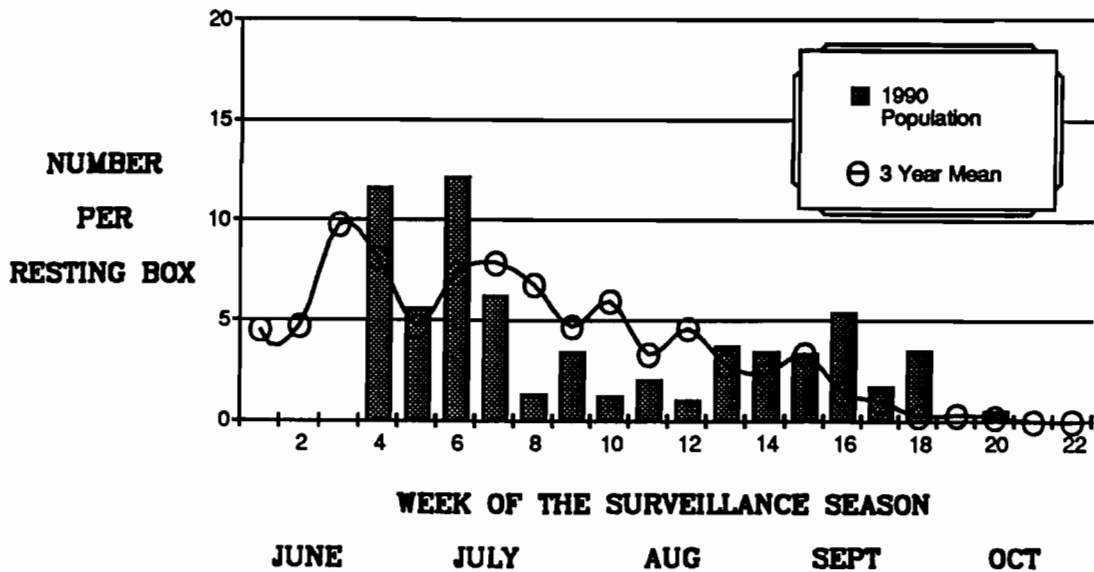


Fig. 3. Resting box populations of *Cs. melanura* at the Hammonton site in Atlantic County during 1990.

Dynamics). Moreover, EEE was becoming a National issue at this time because of accelerated activity in a number of states along the eastern seaboard.

As the season advanced, *Cs. melanura* populations declined at most sites and remained at or below the long term average for the remainder of the season. Fig. 3 shows the population levels for the Hammonton site and clearly shows the above average early season trend and the slow late season decline to normal levels.

THE SEASONAL PROGRESSION OF EEE VIRUS IN 1990

Table 2 compares the earliest and latest isolation dates for EEE virus from *Cs. melanura* by collection site during the 1990 season. Data show that virus first appeared at the Ocean City site on July 6 and at Dennisville the following day. By the end of July, EEE had been detected in *Cs. melanura* at every site that was being monitored. The data also show that the epornitic period was relatively short in 1990. In most years, virus isolations extend well into October. In 1990, virus activity disappeared at most of the sites during late

August and was absent from all but the Bass River site shortly after Labor Day.

Table 3 lists the MFIR values (virus isolations per 1000 specimens tested) by month for each site during the 1990 season. MFIR values greater than 3.00 generally indicate potential equine involvement and values greater than 5.00 signal the possibility for human cases. In 1990, the highest MFIR values occurred during the early season; in fact, the MFIR trend mirrored the population trends in *Cs. melanura* this year.

EQUINE CASES OF EEE IN 1990

The first equine case of EEE was confirmed by the New Jersey Department of Agriculture in early August from a pony stabled within several miles of the Dennisville study site in Cape May County (Table 4). No further equine activity was reported until just before Labor Day when individual horse cases were reported from Atlantic, Burlington and Monmouth counties. The month of September produced equine cases at a number of inland areas with a marked focus in Monmouth County. The Monmouth County Mosquito Control Commission investigated the equine cases and submitted mosquito specimens for virus isolation attempts late in the season.

Table 2. EEE virus isolations from *Culiseta melanura* in New Jersey during 1990.

LOCATION	POSITIVE POOLS	EARLIEST ISOLATION	LATEST ISOLATION
Coastal Sites			
Bass River	15	Jul. 29	Oct. 04
Ocean City	3	Jul. 06	Aug. 31
Dennisville	6	Jul. 07	Aug. 29
Inland Sites			
Hammonton	4	Jul. 15	Sept. 06
Centerton	10	Jul. 27	Sept. 16

Unfortunately, none of the specimens tested positive and no data is available to determine the intensity of EEE amplification in Monmouth County during 1990. Data from the Vector Surveillance study sites indicated minimal virus in the areas that were being monitored. The Monmouth County focus falls outside of the normal surveillance effort and bears consideration

as an area for future virus monitoring attempts.

DISCUSSION

The 1990 encephalitis season in New Jersey was a year where EEE amplification occurred early

Table 3. Minimum Field Infection Rates (MFIR) for *Culiseta melanura* by month during 1990.

LOCATION	TOTAL TESTED	MFIR VALUE				
		June	July	Aug	Sept	Oct
Coastal Sites						
Bass River	3791	-	3.98	4.55	3.59	2.42
Ocean City	1000	0	7.87	4.72	0	0
Dennisville	2634	0	7.83	3.23	0	0
Inland Sites						
Hammonton	1459	-	2.84	3.36	2.87	0
Centerton	2663	-	1.46	6.82	2.99	0

Table 4. Equine cases of EEE in New Jersey during 1990.

ONSET	TOWN	COUNTY	DESCRIPTION	STATUS
Aug 01	Woodbine	Cape May	6 Year old Shetland Pony	PRESUMPTIVE
Aug 30	Mays Landing	Atlantic		CONFIRMED
Sept 01	Pemberton	Burlington		CONFIRMED
Sept 04	Morganville	Monmouth	4 Year old	CONFIRMED
Sept 13	Williamstown	Gloucester		PRESUMPTIVE
Sept 19	Freehold	Monmouth	2 Year old Standardbreed	CONFIRMED
Sept 24	Freehold Twp	Monmouth standardbreed	2 Year old	CONFIRMED
Sept 28	Monroeville	Salem	16 Month old Standardbreed	PRESUMPTIVE
Oct 22	Freehold	Monmouth		CONFIRMED

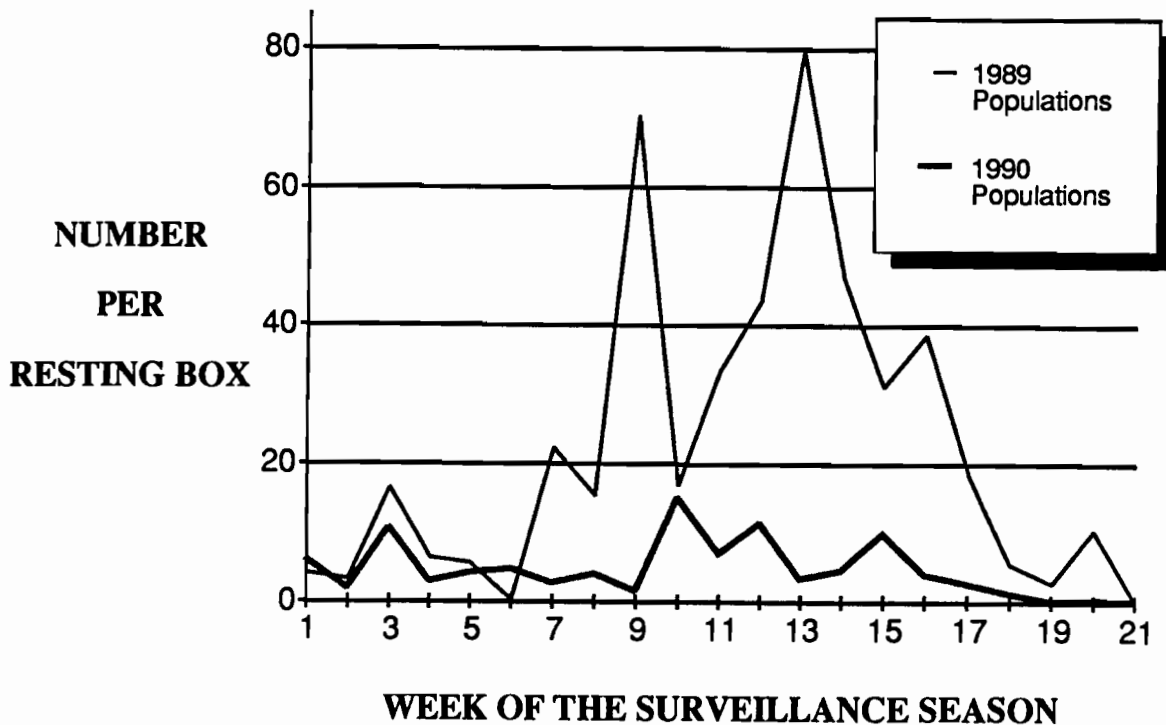


Fig. 4. A comparison of the 1990 populations of *Cs. melanura* at Dennisville with the record levels of 1989.

and then diminished as the season progressed. This was not the case in most of the other states on the eastern seaboard. New York elected to direct special control efforts to abort their late season epizootic and Massachusetts conducted a widespread airspray when human cases signaled a possible epidemic situation.

In New Jersey, *Cs. melanura* populations dropped off as the season progressed, which may, in part have accounted for the relatively low levels of virus transmission in nature. Fig. 4 compares 1989 populations of *Cs. melanura* (a record year) with those recorded in 1990. The data clearly show that *Cs. melanura* were far less capable of sustaining epornitic transmission during this season than they were a year ago and the low populations of the epornitic vector appeared incapable of sustaining the amplification of virus as the season progressed.

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