NEW JERSEY
DEPARTMENT OF AGRICULTURE

NEW JERSEY VECTOR SURVEILLANCE

VOL. 17 NO. 4 PERIOD: 1992 SEASON SUMMATION

ABSTRACT: *Culiseta melanura* populations were lower than normal in the spring of 1992 and extremely dry conditions during the month of July kept resting box collections well below the long term mean at all of the sites that were being monitored for virus in New Jersey. EEE virus was only detected at 2 of the 8 sites included in the investigation. Minimum Field Infection Rates (MFIR) remained low and there was no evidence of an epiornitic peak in any area of the state. No human or equine cases were reported during the season supporting the hypothesis that EEE transmission remained enzootic and that the epizootic phase of the EEE cycle did not occur in New Jersey during 1992.

INTRODUCTION

Eastern equine encephalitis virus (EEE) reached epizootic proportions in several regions of the eastern United States in 1992 but the virus did not pose a health threat to New Jersey during the season. The New Jersey Vector Surveillance Program monitored mosquitoes for EEE from June to October and found little evidence of virus activity at any of the sites that were included in the surveillance effort. *Culiseta melanura* populations were well below their long-term mean throughout the season, which may have accounted for the paucity of virus activity. Near drought conditions during the month of July may also have been a contributing factor.

New Jersey has not experienced severe epizootic activity since 1989 when Minimum Field Infection Rates (MFIR) reached the highest levels ever recorded and a possible human case was contracted near Ocean City. Since that time, *Cs. melanura* populations have remained below their long-term mean and annual virus activity has been minimal.

METHODOLOGY OF THE SURVEILLANCE EFFORT

Culiseta melanura populations were monitored with resting boxes at 8 collection stations in southern New Jersey from late May to mid-October, 1992. Four of the collection sites were located in coastal areas within the zone of known human activity for the state. The remaining 4 sites were located on the inner coastal plain in areas where equine cases have been most frequent. The coastal sites included: Waretown (Ocean Co.), Bass River (Burlington Co.), Corbin City (Atlantic Co.) and Dennisville (Cape May Co.). The inland sites were located at: Turkey Swamp (Monmouth Co.), Hammonton (Atlantic Co.), Waterford (Camden

Co.) and Centerton (Salem Co.). Collections were made once weekly during the surveillance period and all mosquito specimens were frozen on dry ice at the collection site. The specimens were then transported to Rutgers University where they were transferred to an ultra-low temperature freezer and held at -70° C. until they could be processed. Speciation and pooling were conducted on a chill table in the laboratory to maximize virus survival. Pooled specimens were submitted to the New Jersey State Department of Health Laboratories for virus isolation attempts.

Population data from the surveillance effort were entered into a database system for collation and graphics. The results of the virus isolation attempts were added as they became available to facilitate MFIR calculations. Mosquito control agencies within the state were given weekly updates on the status of *Cs. melanura* and EEE virus throughout the encephalitis season to broaden local surveillance programs and guide control decisions.

THE POPULATION DYNAMICS OF *CS. MELANURA* AND THE SEASONAL PROGRESSION OF EEE VIRUS IN 1992

Culiseta melanura populations were below average in the early spring when collections were first initiated by the New Jersey Vector Surveillance Program. In most of the study sites, *Cs. melanura* declined progressively as the season advanced. Figure 1 shows population trends at Centerton, an inland site in Salem County where equine cases occur on a semi-regular basis. Data indicate that the July population peak normally seen from week 5-7 was suppressed, most likely, by the dry conditions New Jersey was experiencing in early summer. Data also show that the late season peak that normally contributes to virus amplification was totally lacking at this site in 1992. The conditions experienced in Salem County were not conducive to virus cycling and no EEE was detected from that site during the season. Similar trends were evident at most of the other sites where *Cs. melanura* and EEE virus were being monitored on a weekly basis.

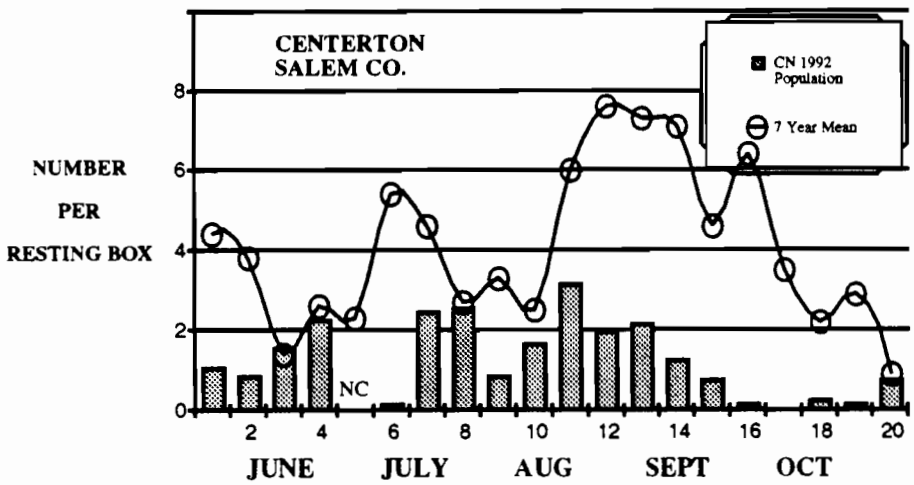

FIG. 1. The 1992 *Culiseta melanura* populations at Centerton, Salem Co. compared with the 7 year mean for that site.

Figure 2 shows the dynamics of *Cs. melanura* populations at Dennisville, the only study site where EEE was repeatedly isolated during the season. Data show that the July peak was realized with significant numbers in the resting boxes during weeks 7 and 8. Populations during August, however, declined markedly and relatively few mosquitoes were available to sustain virus cycling during the latter portion of the season. Virus isolation attempts, however, revealed that low levels of EEE virus were present in *Cs. melanura* from late July through early October. As a result, enzootic levels of EEE were apparently maintained in mosquitoes and birds at that site throughout the season.

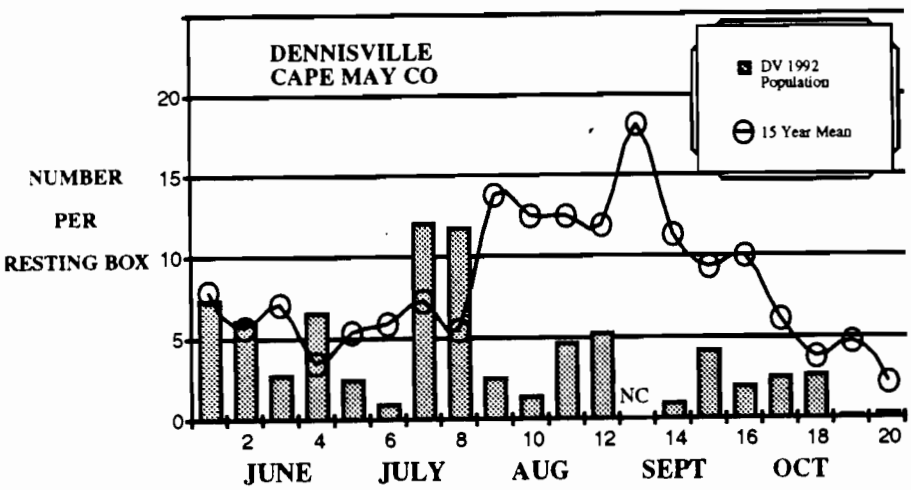

FIG. 2. The 1992 *Culiseta melanura* populations at Dennisville, Cape May Co. compared with the 15 year mean for that site.

Table 1 lists the MFIR values (virus isolations per 1000 specimens tested) by month for each of the sites that were monitored during the 1992 season. Data show that EEE was detected only at Dennisville in Cape May Co. (5 isolations) and at Waterford in Camden Co. (2 isolations). The large sample size from Dennisville reflect the efforts of a research study on the role of salt marsh wading birds and EEE virus rather than the numbers of *Cs. melanura* in that area. The low levels of enzootic EEE cycling at Dennisville in July and August may well have been missed were it not for the concerted efforts to collect and test large numbers of specimens from the area.

Table 1. Minimum Field Infection Rates (MFIR) for *Culiseta melanura* by month during 1992.

LOCATION	TOTAL TESTED	MFIR June	July	VALUE Aug.	Sept.	Oct.
Coastal Sites						
Waretown	542	0	0.	0	0	0
Bass River	1473	0	0	0	0	0
Ocean City	463	0	0	0	0	0
Dennisville	10,121	0	0.25	0.27	1.13	5.26
Inland Sites						
Turkey Swamp	41	0	0	0	0	0
Hammonton	660	0	0	0	0	0
Waterford	639	0	0	0	2.89	0
Centerton	1424	0	0	0	0	0

DISCUSSION

Data from the 1992 surveillance season suggest that EEE virus did not transcend the enzootic cycle at any of the New Jersey study sites that were being monitored for virus activity. In 6 of the 8 areas that were being monitored, EEE was not detected at any point in the season, indicating that virus levels were either very low or that virus transmission was non-existent. At the Waterford site in Camden Co., EEE was isolated from pools of *Cs. melanura* collected September 22 and September 29, suggesting that virus did not cycle in that area until fairly late in the season. At the Dennisville site in Cape May Co., EEE was isolated on 5 occasions, July 30, August 13, September 8, September 23 and October 1. MFIR values at Dennisville showed a progressive rise as the season progressed, however, each of the monthly data points represents a single isolation. As a result, enzootic transmission was probably taking place at low levels over the course of the entire encephalitis season. The large sample size from that area may have contributed significantly to detection of virus early in the seasonal cycle.

ACKNOWLEDGMENTS

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