New Jersey Vector Surveillance

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Introduction

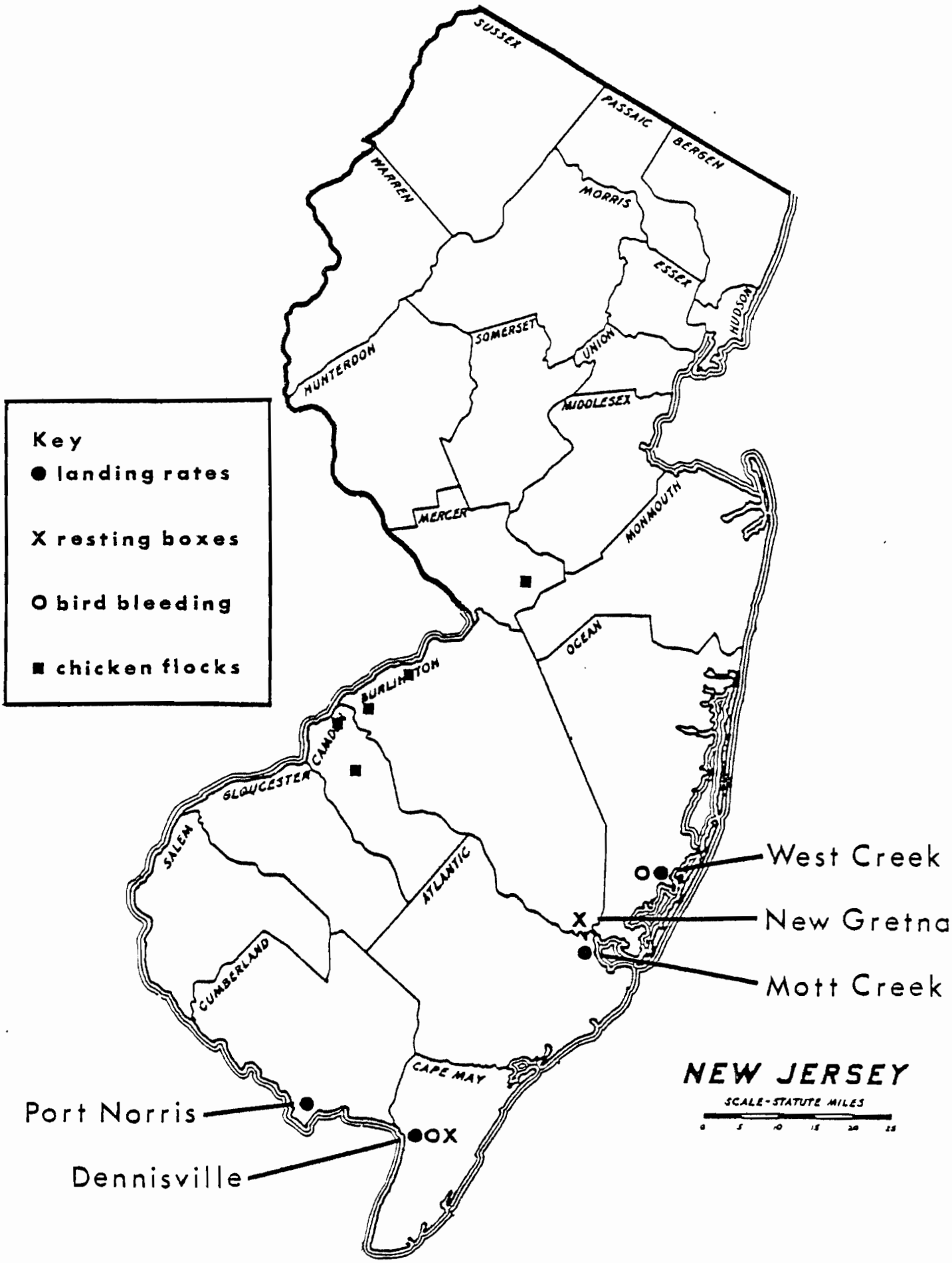
Laboratory results have confirmed the intensity of the eastern encephalitis virus (EE) epizootic that southern New Jersey is experiencing this year. Virus isolations from Culiseta melanura are being recovered at a rate that is approximately 3 times higher than previous epizootic periods. During the first 2 weeks of August, 22 separate pools of Cs. melanura tested positive at the Dennisville site alone. Two additional equines have been confirmed, bringing the total to six, but the most recent horse cases have been coastal rather than inland. Of special significance is the recovery of EE virus from a pool of Aedes sollicitans, documenting virus transfer to the mosquito considered as the primary epidemic vector. Aerial control has been intensified in all coastal areas and biting populations of Ae. sollicitans have been significantly reduced. No human cases have been reported to date, but the potential for human involvement still remains.

The Status of EE in Horses

The first 4 horse cases occurred at inland areas of New Jersey where Coquillettidia perturbans appeared to be the dominant biting mosquito (See Vol. 7 No. 3). Since that time, two additional equine cases have been confirmed from coastal sites that were far removed from the initial focus of equine encephalitis. The first coastal horse case occurred at Estelle Manor on the border of Atlantic and Cumberland Counties. The animal died on August 27 and had apparently not been vaccinated. A survey of the area showed a sizeable cedar swamp in the immediate vicinity that was producing Cs. melanura. The upper reaches of the Tuckahoe River provided a flight path for Ae. sollicitans from the Atlantic coast and the farm was also in range of Ae. sollicitans originating from the Delaware Bay marshes.

Light traps baited with dry ice collected a variety of fresh and salt water mosquito species including Culex salinarius, Psorophora columbiae, Aedes sollicitans and Coquillettidia perturbans.

The second coastal horse case occurred two days later at a riding stable near Cape May City at the extreme southern tip of New Jersey. The NJAES and Cape May County Mosquito Commission had been conducting a year-long survey in the immediate vicinity, thus considerable mosquito population data are available. Ironically, the survey was instituted to justify mosquito control in and around a wildlife sanctuary where EE was cited as a potential hazard to human and animal health. A variety of fresh, brackish and saltmarsh species reach sizeable populations in that area. The coastal cedar swamps produce Cs. melanura in high numbers and the surrounding marshes are responsible for Ae. sollicitans throughout the season. The farm is also located near a freshwater marsh that produces one of the largest Cq. perturbans populations in the State. Mosquito collections have been submitted for virus assay from all of the sites where equine involvement has been documented. No virus has been recovered from any of the specimens to date.


Key
● landing rates
X resting boxes
O bird bleeding
■ chicken flocks
SUSSEX
PASSAIC
BERGEN
WARREN
MORRIS
ESSEX
HUDSON
HUNTERDON
SOMERSET
UNION
MIDDLESEX
MERCER
MONMOUTH
OCEAN
BURLINGTON
CAMDEN
GLOUCESTER
SALEM
ATLANTIC
CUMBERLAND
CAPE MAY
West Creek
New Gretna
Mott Creek
Port Norris
Dennisville
NEW JERSEY
SCALE - STATUTE MILES
0 5 10 15 20 25

The Status of EE in Culiseta melanura

Culiseta melanura populations are behaving in an atypical fashion at each of the study sites that are being monitored but the significance of the population trends are unclear at this time. Virus activity at Dennisville (West Coast) was intense during the first 2 weeks of August, corresponding with a dramatic increase in Cs. melanura at that site (Fig. 1). Since that time, the numbers of mosquitoes have dropped considerably and the resting boxes are yielding relatively low numbers for virus assay. EE virus is still being recovered from the mosquitoes that are being processed, but not at the rates seen during early August. Data on the rates of virus vs. the numbers tested will ultimately provide insight on the progression of virus during the season. During past epizootics, the rate of isolation showed a steady progression from August to October with a peak period in late Fall.

Culiseta melanura at New Gretna (East Coast) remain high at a time when the populations are normally in a rapid decline. Only one EE isolation has been made from mosquitoes collected at New Gretna this year (Aug. 13), thus the virus has apparently remained at low levels during most of August. The results of specimens submitted in early September should show if the high Cs. melanura populations at that time resulted in an amplificaton peak similar to that seen at Dennisville nearly a month earlier.

The Status of EE in Aedes sollicitans

For the first time since these studies were initiated, EE virus was isolated from Ae. sollicitans during a documented epizootic. The isolation was made from a single pool of 52 unengorged Ae. sollicitans collected at Dennisville on August 4. The isolation parallels the intense EE activity in Cs. melanura at that site and occurred at a time when the vector potential index was nearly at its peak. The mosquitoes apparently originated from the moontide of July 20 and had reached 70% parity at the time of the collection. The brood had been significantly reduced by aerial sprays some days earlier, thus the isolation was made from the remnants of a sizeable emergence. This brood completely dissipated during mid August but was replaced by a fresh brood from the August moontide later in the month.

The influx of nullipars was evident in the collections very late in August with an anticipated peak in vector potential over Labor Day. Aerial control, directed toward eliminating the peak, was highly successful and biting populations were kept to a minimum along most areas of the coast. Minor emergences have occurred since that time with populations of mixed age as the general rule in September. The combination of control and cool temperatures has reduced mosquito annoyance considerably along the entire coast.

Mosquito collections for virus assay have been accelerated to determine if EE again transfers to Ae. sollicitans as the season advances. Particular attention will be focused on specimens already collected from the late August brood. The September 17 moontide could also produce mosquitoes that make contact with EE. Data from this Program show that EE virus activity can extend well into October. Wild bird bloods, mosquitoes and virus will be monitored this year until cool weather terminates all activity.

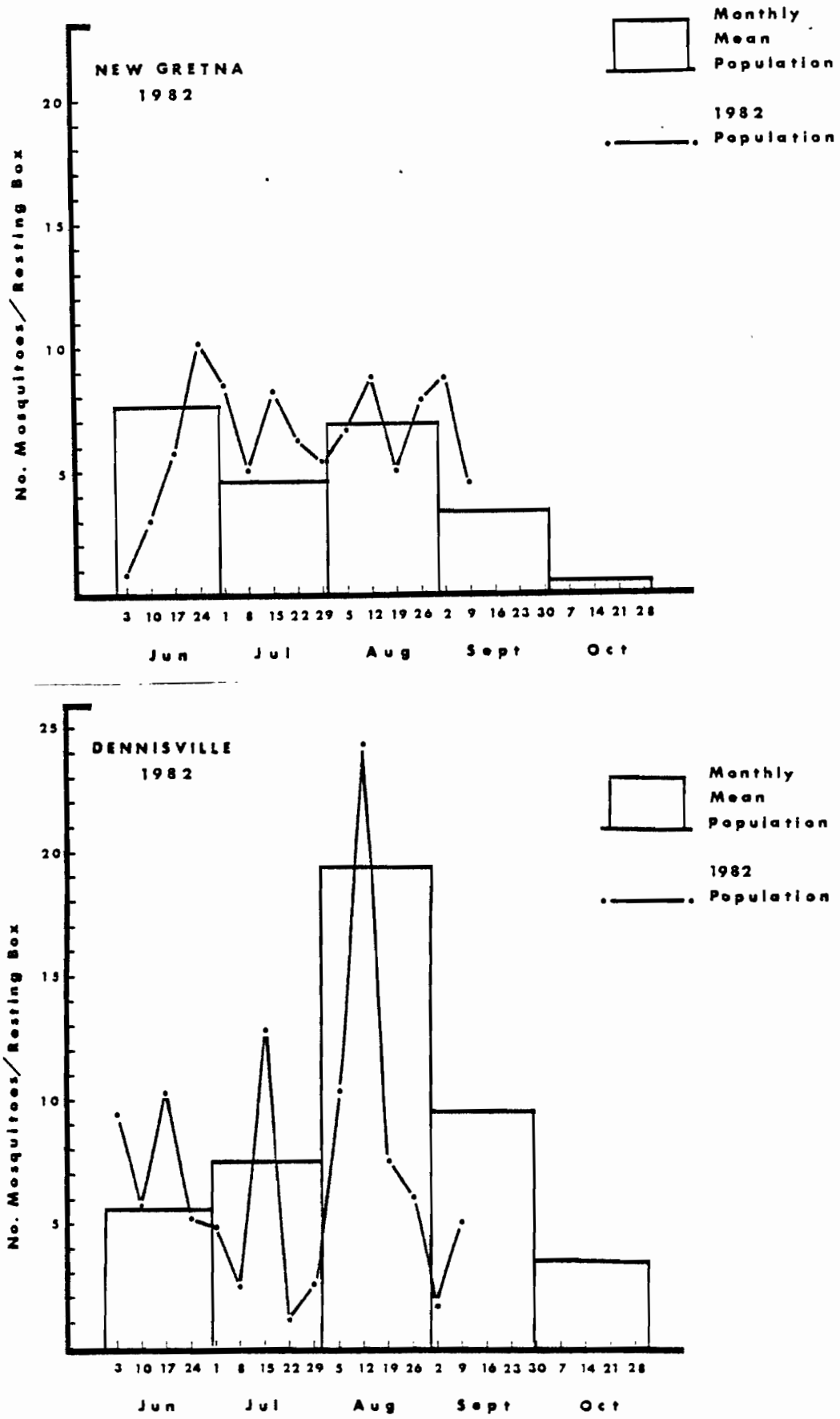


Figure 1. Culiseta melanura populations at the New Gretna (east coast, top graph) and at the Dennisville (west coast, bottom graph) study sites as measured by resting box collections.

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