*Mosquito Surveillance Report**

Prepared by Dr. Wayne J. Crans

Vol. 11 *No.* 6 *Period* Summary of 1983 Season

The 1983 mosquito season was initiated with an excessively wet spring with near record rainfall over much of the United States. The news media were quick to print stories forecasting record mosquito populations and the probability of mosquito-borne disease. During the month of May, newspapers, radio, television and weekly news magazines devoted feature stories to the mosquito and mosquito control operations. Ironically, little attention was given to the human and equine cases of mosquito-borne encephalitis that occurred in 35 states later in the summer.

During this period, the New Jersey State Mosquito Surveillance Program statistically analyzed data from 80 sentinel light traps that have been used to monitor mosquito populations since 1973. The results clearly show that the mosquito population forecast cannot extend beyond one brood of floodwater mosquitoes and that population estimates for salt marsh and permanent water breeders are not possible without long-term weather forecasts. Some of the predictions made during the spring of 1983 were realized as the season progressed. For the most part, however, light trap data do not bear out the forecasts publicized by the media.

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EARLY SEASON *Aedes*

The early season *Aedes* were extremely abundant in most areas of New Jersey during 1983 and epitomize the predictions of record mosquito populations that were predicted in the news media. The excessive rainfall in the early spring flooded vast acreages of woodland pool habitat and the constant rain kept most areas flooded long enough to allow emergence. Light trap data suggest that biting populations of early season *Aedes* species were approximately 5 times higher than normal during the middle of June. Since early season *Aedes* have only one generation, annoyance dissipated as the summer progressed. Even so, spring *Aedes* species appeared in some light trap collections well into the month of August.

Figure 1 plots the population levels of *Aedes canadensis* from the northwestern portion of New Jersey during 1983. The results show that this representative early season *Aedes* was well above the 5-year average in the early spring and persisted well into the month of July. Light trap and landing count records suggest that *Aedes stimulans*, *Aedes excrucians* and *Aedes abserratus* populations behaved similarly in most areas of the State.

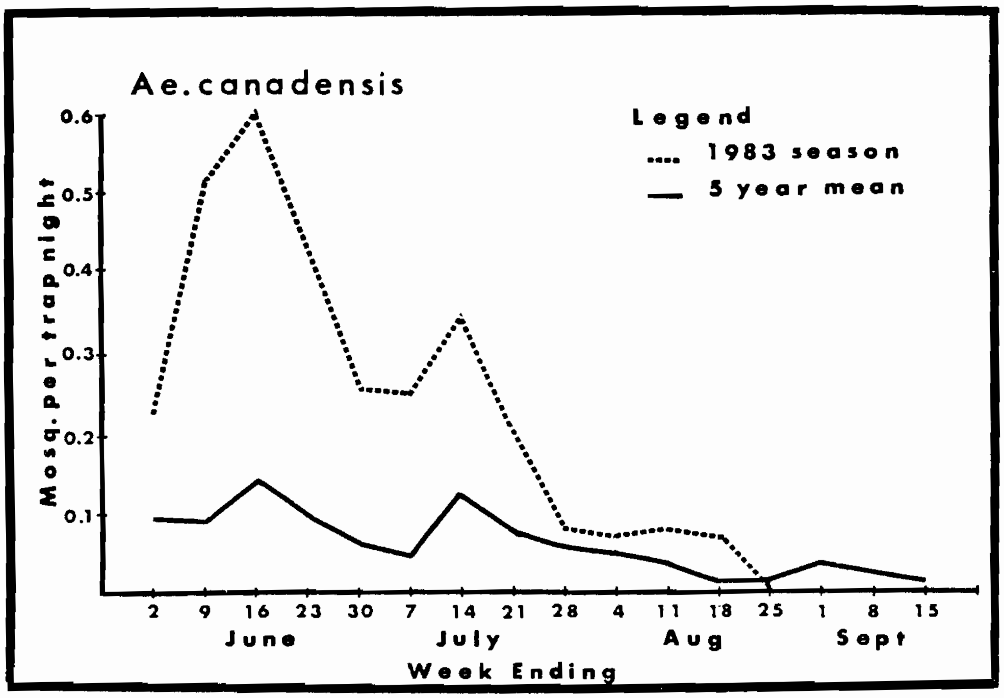

Fig. 1. *Ae. canadensis* populations in the North Rural region of New Jersey during 1983.

FLOODWATER *Aedes*

The floodwater *Aedes* responded to the record spring rains with mid-June populations that were nearly 2 times higher than the 5-year average. During the month of June, the floodwater *Aedes* species combined with early season *Aedes* to produce severe annoyance throughout the State. As the summer advanced, however, abnormally hot-dry conditions severely reduced breeding habitat and discouraged significant broods of the multivoltine species. As a result, populations of floodwater mosquitoes were below average in July and August.

Figure 2 plots the abundance of *Aedes vexans* in the Passaic Valley during the 1983 season. The plot is fairly representative of the floodwater group as a whole and shows that season-long predictions cannot be forecast by spring conditions for species that rely on rainfall to produce multiple broods during the season.

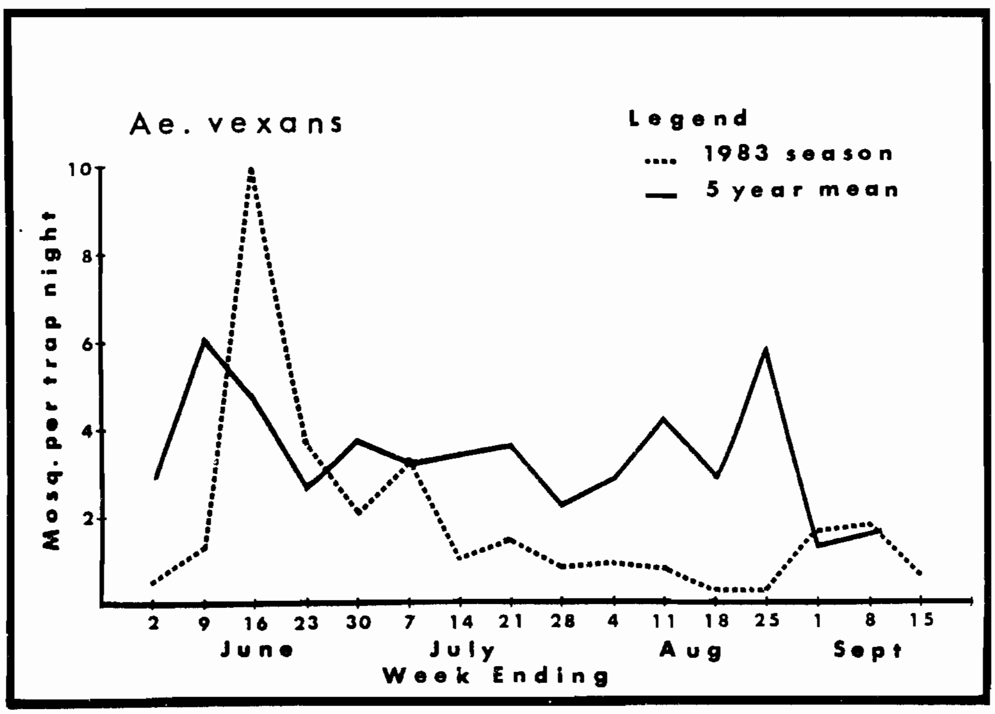

Fig. 2. *Ae. vexans* populations in the Passaic Valley region of New Jersey during 1983.

Culex COMPLEX

The spring rains had little affect on members of the *Culex* complex, mosquitoes that depend mainly upon permanent water to establish continuous breeding populations. *Culex* numbers remained below average during the period of greatest rainfall, a phenomenon that is fairly typical for the entire group. High water levels eliminate much of the *Culex* breeding habitat by removing the pocket water that is favored by most species. Drying conditions are more conducive to high *Culex* populations because of the numerous small collections of water that are created. The hot-dry conditions during July and August of 1983 did favor *Culex* breeding in many areas of the state. In late summer, *Culex* populations showed an abrupt increase in most of the areas that were sampled.

Figure 3 plots population levels for the North urban area of New Jersey during 1983. The population curve is typical for the *Culex* complex that was sampled from urban areas during the season.

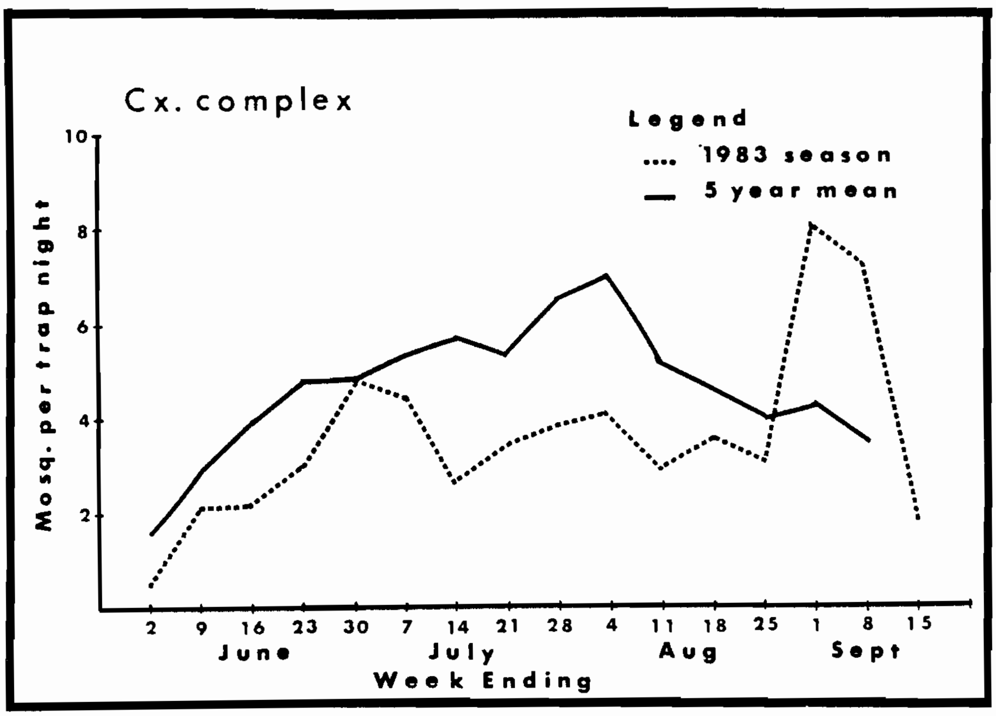

Fig. 3. *Culex* populations in the North Urban region of New Jersey during 1983.

SALT MARSH MOSQUITOES

The 1983 salt marsh mosquito populations showed that neither weather patterns nor long-term averages can be used to predict absolute numbers over a period of time. The spring rains appeared to have a marked affect on June populations of salt marsh speices but, thereafter, the tides produced broods that fluctuated above and below the 5-year average.

Figure 4 plots Aedes sollicitans populations along the Atlantic coast during 1983. The data show that major broods occurred in June, July and August. The data also suggest that peak populations were the result of tidal action rather than rainfall and the numbers of mosquitoes had little bearing on the amount of rainfall experienced early in the season.

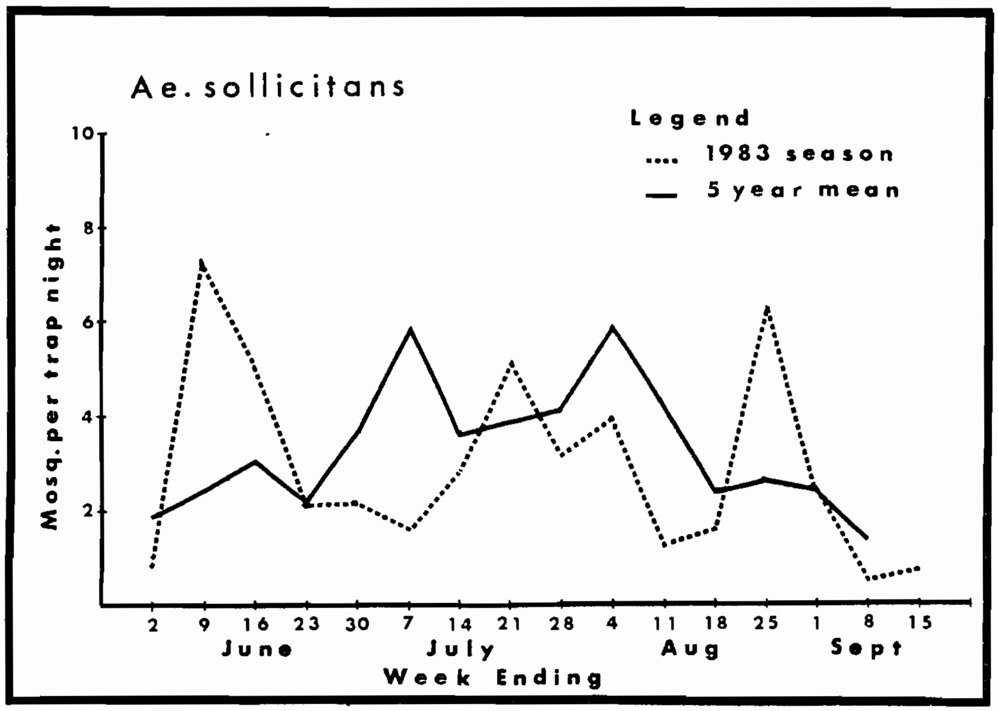

Fig. 4. Ae. sollicitans populations in the Atlantic Coast region of New Jersey during 1983.

COQUILLETTIDIA PERTURBANS

Coquillettidia perturbans was the only mosquito that responded to pre-season predictions with record numbers throughout the State for the entire summer. Light trap records showed that Cq. perturbans showed a marked peak during July that was 3-5 times higher than the 5-year average. The peak was exhibited in every region that was sampled and suggested that conditions were ideal for survival and successful emergence. The abrupt increase was accompanied by isolation of EEE virus, suggesting that this species was a major vector of EEE to horses during the 1983 season. Cq. perturbans has long been suspected of participating in the encephalitis cycle in New Jersey, but the evidence collected in 1983 was the first firm proof that the species assumes a major vector role.

Figures 5 and 6 plot Cq. perturbans numbers in the two areas of the State that experienced equine fatalities due to EEE virus. Both the North Rural region (1 equine death in Sussex Co.) and the Coastal Plains region (4 equine deaths in Ocean Co.) had Cq. perturbans populations that were well above the 5-year average. The correlation between spring precipitation and mid-summer mosquito populations is unclear for a permanent water breeder that overwinters in the larval stage. Further examination of surveillance data from county mosquito commissions may reveal if the trend has been repeated in the past. Similar data would be useful to see if correlations exist between Cq. perturbans numbers and human or equine cases of EEE.

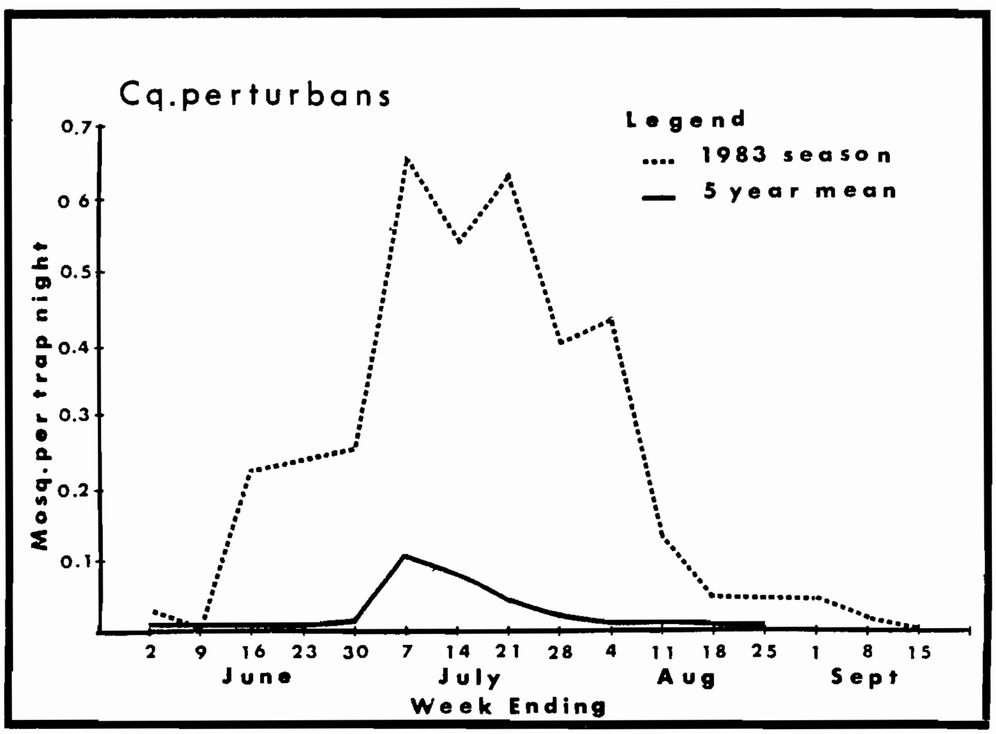

Fig. 5. Cq. perturbans populations in the North Rural region of New Jersey during 1983.

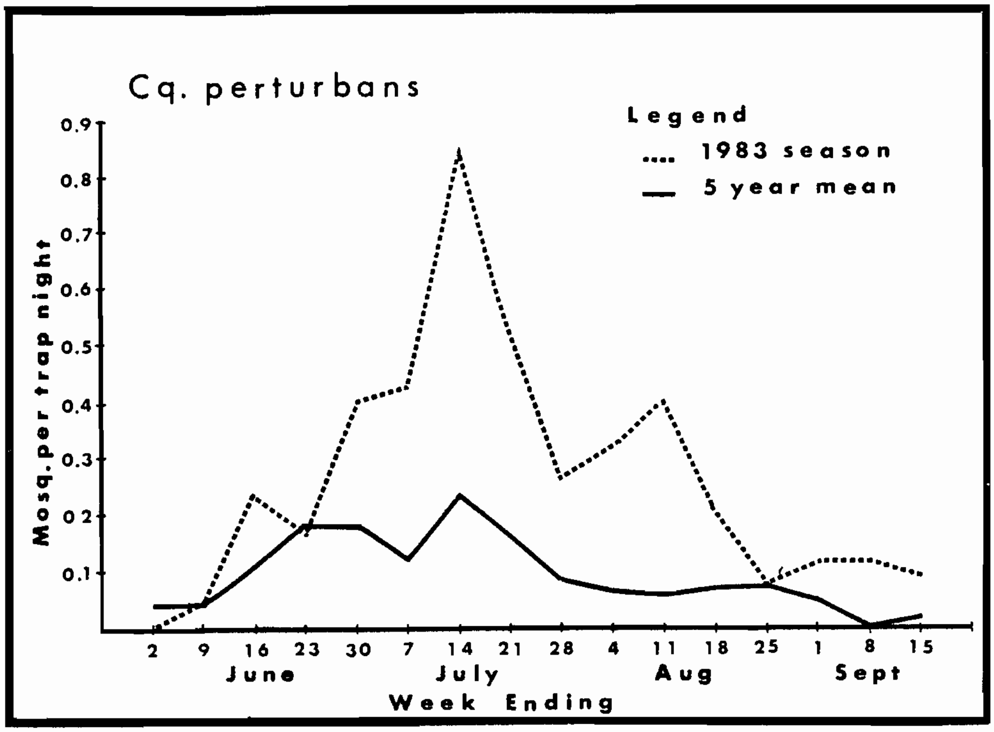

Fig. 6. Cq. perturbans populations in the Coastal Plains region of New Jersey during 1983.

The 1984 mosquito season was again initiated with excessive rainfall in New Jersey with severe flooding in the Northern portion of the State during the month of April. Heavy rains at the end of May reflooded much of the State and wet weather persisted throughout much of June. Once again, the media printed stories predicting record mosquito populations for this summer. It will be interesting to see if surveillance data backs the claim.