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Abstract

Field experiments were conducted to monitor the population of *Culex nigripalpus* in Florida and measure the influence of various factors on virus transmission. Mosquitoes were captured using chicken baited lard can traps at three locations. Grate aspirator collections of resting mosquitoes also provided information on the age structure of the population. Population levels varied from site to site, but all sites showed an increase in *Cx. nigripalpus* towards the end of the 2005 collection season. Parity status of empty female mosquitoes was determined by observation of dissected ovaries. Parity rates seem to correlate with rainfall patterns. Infection and transmission rates are currently being measured.

Introduction

In Florida *Culex nigripalpus* is thought to meet the requirements to be a suitable vector of West Nile virus (WNV) (Chamberlain et al. 1964, Dow et al. 1964, Shroyer 1991). In order to better understand the transmission cycle of WNV, we need to better understand the population dynamics of this vector species as well as understand the factors that may influence transmission of the virus, such as age structure. Age structure of the vector population may play a more critical role in transmission dynamics. A large population of newly emerged mosquitoes does not pose the same risk as a smaller population of older individuals. As the population ages, the risk of infection and transmission increases.

Our research goal is to examine WNV infection and transmission in Florida during a multi-year period. We plan to measure infection rates and transmission rates, as well as track the population changes of *Cx. nigripalpus* in representative locations.

References Cited

Chamberlain, R.W., Saito, W.D., Coleman, P.H. and Beattie, L.D. 1964. Vector studies in the St. Louis encephalitis epidemic, Tampa Bay area, Florida, 1962. *Am. J. Trop. Med. Hyg.* 13: 456-461.
 Dow, R., Coleman, P.H., Meadows, K.E. and West, T.H. 1964. Isolation of St. Louis encephalitis viruses from mosquitoes in the Tampa Bay area of Florida during the epidemic of 1962. *Am. J. Trop. Med. Hyg.* 13: 462-474.
 Shroyer, D.A. 1991. The 1990 Florida epidemic of St. Louis encephalitis: virus infection rates in *Culex nigripalpus*. *J. H. Mosq. Control Assoc.* 62: 69-71.

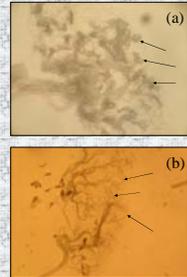


Figure 3. A nulliparous ovary (a) with coiled tracheoles and a parous ovary (b) with uncoiled tracheoles.

Results

The trap collections are being sorted and pooled. Virus testing of the mosquito pools and antibody testing in the chicken serum is in progress. Figures 4 and 5 shows the trap collection results for the collections that have already been sorted. The predominant species captured at each site was *Cx. nigripalpus* (Figure 4), although as many as 10 different species were captured at any one site, with a total of 16 different species found in all sites. Figure 5 shows only *Cx. nigripalpus* females captured. Manatee County had the lowest average of mosquitoes per trap (319), while Duval County had the highest average value (1150). Indian River County had an average of 990 mosquitoes per trap. Aspirator collections numbers were low in all locations. The most successful aspiration was done at Indian River County. Figure 6 shows the percentage of nulliparous mosquitoes for Indian River County and cumulative rainfall for the 2005 collection period.

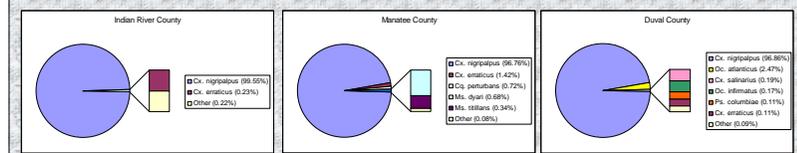


Figure 4. The relative abundance of the predominant species caught in the lard can traps.



Figure 1. Collection sites in Florida



Figure 2. Lard can trap

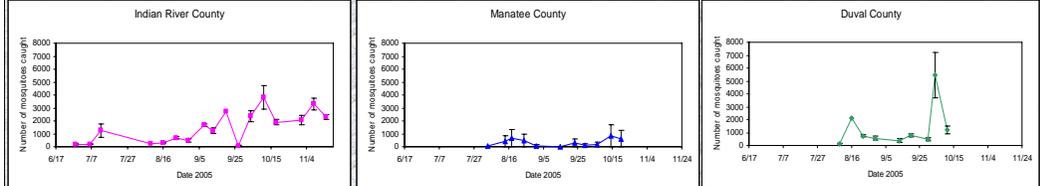


Figure 5. Average trap collections of *Cx. nigripalpus* over time for each of the three trapping sites. Each site showed an increase in the numbers of females caught towards the end of the collection season, starting in late September.

Materials and Methods

Lard Can Trapping

- Three habitats chosen to trap: Indian River County, Manatee County, Duval County (Figure 1)
- Four chicken baited lard can traps left out overnight (Figure 2)
- Mosquitoes pooled based on species and bloodfed status
- Test for virus in the mosquito pools, viral antibodies in the chicken blood

Aspirator Collections

- Backpack aspirator used to collect resting mosquitoes
- Mosquitoes sorted based on species and sex
- Female *Cx. nigripalpus* classified as newly emerged, empty, bloodfed, and gravid
- Empty female *Cx. nigripalpus* were dissected and ovaries removed
- Ovaries examined to determine if tracheoles were coiled (Figure 3a) or uncoiled (Figure 3b)

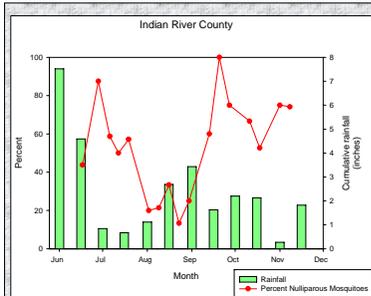


Figure 6. The percent of empty *Cx. nigripalpus* mosquitoes from the aspirator collections that are nulliparous graphed with 15 day cumulative rainfall. Both graphs show a similar bimodal pattern.

Discussion

Lard Can Trapping

- Populations low overall
- Increases in population sizes in mid to late September
- Trap collections were predominantly *Cx. nigripalpus*
- Virus testing and serum antibody testing is ongoing

Aspirator Collections

- Aspiration was most successful in Indian River County
- Proportion nulliparous decreased following dry periods
- Age structure may be correlated with rainfall, which could predict times of increased risk of WNV transmission