A Comparative Study of Larval Culicid Species at Peach Creek Equestrian Center (College Station, TX)

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Edited by: James McCain

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Abstract: It has long been noted that mosquitos pose a substantial threat to humans not only in the United States, but also on an international land. Deemed the most dangerous animals in the world, the family Culicidae (Diptera) are highly potent vectors of some of the world's most deadly diseases including but not limited to Malaria, Chikungunya, Dengue Fever, and Yellow Fever. Given the overall danger associated with these animals, the study of their populations and the epidemic potential that they pose is of the utmost importance in global public health. This study focused on establishing a relative population comparison of the bodies of water at Peach Creek Equestrian Center, a relatively isolated ranch south of College Station, TX, and found that the only species discovered in three bodies of water was *Psorophora sp.* (Diptera, Culicidae).

Key words: vector, Culicidae, public health, survey, comparison

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Given that mosquitos are the primary vector for a variety of diseases of both humans and animals, research on effective methods of discontinuing the spread of the vector and thus the disease are a focus of major importance within the entomological and mosquito populations experience a dramatic increase in early summer months, peak from July until October in southern North America, and shift to limited feeding from November into winter months (Edman and Taylor, 1986). The physiology and lifecycle of the mosquito lend ten particularly high vector capacities; blood-feeding insects expose the host to a characteristically wide array of blood-borne pathogens, and the long-range flight abilities allow pathogen exposure by one vector to an array of hosts over a epidemiological spectra of science. Critical to the control and eradication efforts is the understanding not only of vector lifecycle but also of the location and dispersion of Culicidae species within an area of interest. As a general tendency, active blood-feeding relatively large expanse of land (Bates, Marston, 1949).

Southern areas of the United States are particularly susceptible to mosquito related epidemic disease transmission, and the weather patterns of heavy rainfall and regular flooding in College Station, TX favor mosquito species that oviposit in floodwater. The rapid development time of *Psorophora* species are particularly efficient in Texas floodwater areas (Wood *et al* 1979).

Materials and Methods: All insect collecting was done at Peach Creek Equestrian Center (19888 Highway 6 S, College Station, TX, 77840), from three different bodies of water spaced a minimum of one mile apart from one another. All bodies of water were observed to undergo floodwater filling and draining such that within fourteen days of flooding, embankments were largely emptied. Of the three bodies of water collected from, each was selected for unique surroundings: Pond #1 was characterized by minimal tree cover and heavy livestock presence. Pond #2 was located in a heavily wooded area and shaded by trees. Pond #3 was rapid draining and served as a feeding body of water to a larger pond located approximately 500 feet from it. Collection was accomplished following a period of heavy flooding in late October. All samples were collected on October 26, 2015.

Collection of larval specimens was achieved through use of a ladle-like implement consisting of a two foot long wooden pole was attached to a one-cup measurement pitcher (Bioquip, Compton, California). Specimens were collected from the surface area of the banks of flooded pond areas. Specimens were flash boiled and preserved in 80% ethanol solution and contained in glass insect vials (Bioquip, Compton, California). Specimens were then identified in the Texas A&M University Entomology Department laboratory.

Results: Pond #1 yielded seventeen larval Psorophora sp. of a variety of instars. Six third instar larval Psorophora sp. were collected from pond #2 (note: specimens from pond #2 were identified within 24 hours of collection. These were believed to be dead or nearly so at the time of identification and were returned to water storage as opposed to alcohol vials. Within 24 hours of identification, larvae entered pupal stage). Six third instar Psorophora sp. specimens were collected from pond #3.

Conclusion: Psorophora mosquitos are among mosquito families that are characterized by rapid immature development and floodwater colonization as part of their lifestyle. While Psorophora are not known to be highly competent vectors of any of the major mosquito vectored pathogens (Dengue Fever, West Nile Virus, Malaria, etc), the (University of Florida Extension). These findings were consistent to expectations that Psorophora would be the dominant species in the Peach Creek area of College Station Texas, but it was surprising that no other larval species were collected. This lack of diversity in the collection is likely due to the time of collection; all larvae collected were obtained within 48 hours of heavy rainfall. Species characterized by longer development cycles were less likely to have eclosed within family has been known to vector viral encephalitis. Also noteworthy, *Psorophora ciliata (*Fabricius) is one of the most prevalent species of Psorophora, is endemic to Texas, and has historically tested positive for Eastern equine encephalitis, Venezuelan equine encephalitis, Western equine encephalitis virus, Tensaw virus, and West Nile virus the short period between oviposition and collection.

Monitoring and regulation of mosquito populations is of vital importance to the minimization of disease transmission risk in areas where mosquito-borne illnesses are endemic. Data collected in this study suggests that vectors of major concern are not prevalent in the Peach Creek Equestrian Center area of College Station, TX, as the much less concerning Psorophora sp. was collected exclusively at all areas tested.

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