

MOSQUITO DENSITIES IN ORANGE COUNTY, TEXAS

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The flat coastal plains of Texas, with annual rainfall in excess of 50 inches and a moderate climate, are well-known to offer optimum conditions for the production of large mosquito populations. Orange County has a full complement of all of the drainage problems which are typical of the area. The county is shaped somewhat like a broad horseshoe with the higher land in the center and along the top or open end of the shoe. The still higher land areas of Newton and Jasper Counties adjoin Orange County on the north, and the uncontrolled surface water runoff from 104,000 acres of these higher lands is discharged into Cow Bayou, Adams Bayou and other Orange County streams.

The county boundaries to the east, the south and the west are two major rivers, the Sabine and the Neches. Both become tidal estuaries a few miles below the north boundary of the county, and the tidal

marshes along the lower reaches of these rivers, particularly on the Neches, attain maximum widths of up to 4 miles between the river channel and the 5-foot contour. These rivers join at Lake Sabine, a salt water arm of the Gulf of Mexico which covers nearly 100 square miles. A 15-square-mile wedge of the lake is included in Orange County.

The area of Orange County is usually listed at 356 square miles or 227,840 acres. Recent computations by one of the authors (JGF) indicate a total area of 367 square miles to be included between the western bank of the Sabine River, the eastern bank of the Neches River and the Newton-Jasper County line. Approximately 84 square miles, or 53,760 acres, are either submerged or in tidal and river marshes, below the 5-foot contour, and cannot be drained by gravity. The land area above the 5-foot contour is approximately 283 square miles, or 181,120 acres. There are in Orange County some 32,256 acres of marshland below 3 feet in elevation; of this

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some 23,844 acres are below 2 feet in elevation. The area of marshland below 2 feet in elevation is continuously submerged or is subjected to continuous intermittent flooding because of the daily tidal fluctuation. During spring tides, the area of marshland above 2 feet in elevation, and below 3 feet in elevation comprising some 8,412 acres is also flooded.

A few small, flat knolls in the extreme northern part of the county reach an elevation of 30 feet above sea level, sloping down to the normal high tide level of the river marshes, which is about 3 feet above sea level, with natural gradients of 1 or 2 feet per mile. As a result, most of the natural streams and watercourses are very slow moving, and therefore very crooked.

The areas of residential development and the county's population are largely located on sites of 6 to 18 feet in elevation. The lands above 20 feet in elevation are chiefly in timber, pasture, and rice fields, with a good deal of wet prairie and some sawgrass marshes.

During the summer of 1958, New Jersey light traps were operated in all urban areas within Orange County to determine mosquito population densities and relative species abundance (Figure 1). This information was needed in order that the limited funds available for mosquito control might be most intelligently expended. The specimens were submitted to the Entomology Section, Texas State Department of Health, for identification.

The traps were operated in 30 locations for 148 trap nights from May 1 to September 10, 1958, in Orange (population 32,000), West Orange (population 2,539), Bridge City (population 5,500), Vidor (population 7,800), Mauriceville (population 700) and Orangefield (population 1,000). Meteorological data taken during this period are given in Table 2.

As shown in Table 1, a total of 18,076 mosquitoes of 24 species were taken. An average of 122.14 per trap night was obtained. Of particular interest was the fact that only 4.4 percent were *Aedes sollicitans* and a negligible number *A. taeniorhynchus*. Excluding the *Uranotaenia*

which are not believed to bite human beings, 5.8 percent of the mosquitoes were *sollicitans*.

These results were somewhat surprising; even though light traps do not directly reflect the number of *sollicitans* flying and biting during daylight hours, the species is generally regarded as being sufficiently attracted to light during nocturnal operational periods to make light traps useful in measuring population densities.

It is not our intention to minimize the salt-marsh mosquito problem in the Gulf Coast area. However, many of the salt

TABLE 1.—Relative abundance of mosquitoes collected in light traps at Orange, Texas, May 1–September 10, 1958

<i>Uranotaenia lowii</i>	4,250
<i>Psorophora confinnis</i>	4,100
<i>Anopheles crucians</i>	3,900
<i>Culex quinquefasciatus</i>	2,444
<i>Aedes sollicitans</i>	798
<i>Anopheles quadrimaculatus</i>	631
<i>Mansonia perturbans</i>	510
<i>Culex salinarius</i>	385
<i>Aedes vexans</i>	354
<i>Aedes mitchellae</i>	347
<i>Aedes taeniorhynchus</i>	81
<i>Culex erraticus</i>	81
<i>Uranotaenia sapphirina</i>	61
<i>Psorophora discolor</i>	32
<i>Psorophora ferox</i>	30
<i>Anopheles atropos</i>	27
<i>Anopheles walkei</i>	16
<i>Psorophora signipennis</i>	10
<i>Aedes thelcter</i>	5
<i>Aedes trivittatus</i>	4
<i>Aedes atlanticus</i>	4
<i>Culiseta melanura</i>	4
<i>Orthopodomyia signifera</i>	1
<i>Psorophora ciliata</i>	1
Total	18,076

TABLE 2.—Meteorological data from U. S. Weather Bureau, Port Arthur, Texas

Month	Precipitation	Average daily maximum and minimum temperatures
May	2.69	76.2
June	1.93	82.8
July	5.65	84.0
August	2.59	82.8
September	14.59	79.2

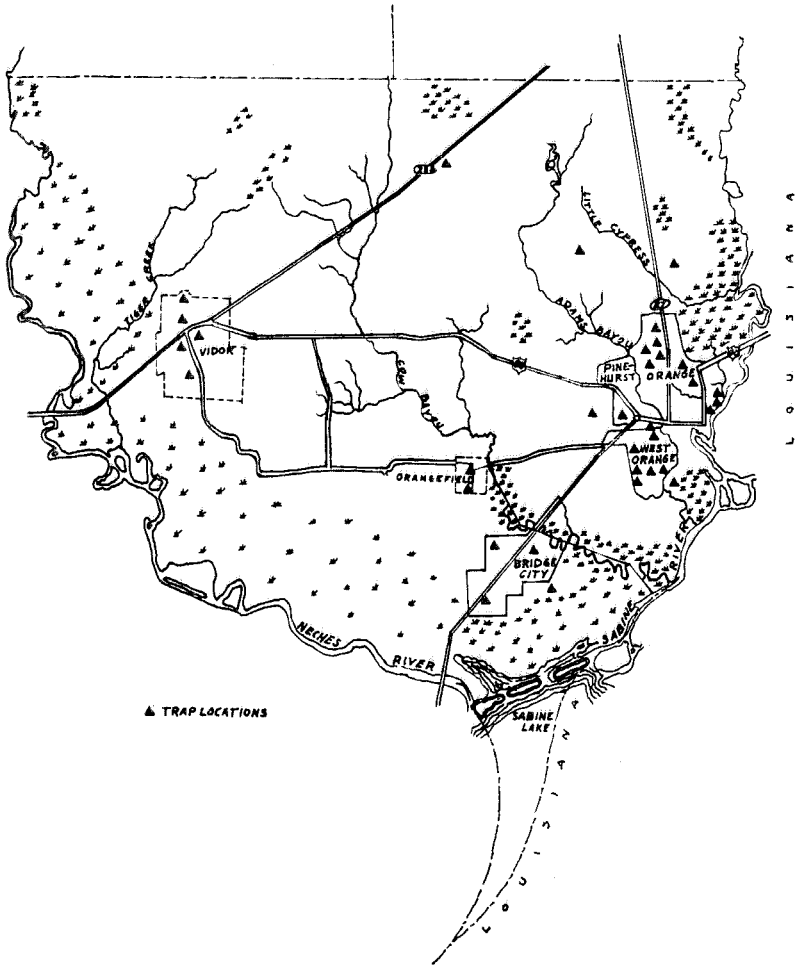


FIG. 1.—Map of Orange County, Texas, showing location of light traps.

marshes in which *sollicitans* menace sportsmen and domestic animals are well removed from populated areas. Dispersal by flights or as a result of high winds to urban areas may necessitate the use of adulticides against them. Promotion of mosquito abatement along the Texas Gulf Coast is sometimes adversely affected by the feeling that the problem presented by *sollicitans* breeding in salt marshes well removed from inhabited areas or even in

other counties is of such a magnitude as to render localized control in and around municipalities of little value. However, the Orange County light trap catches indicate that this is not necessarily the case and that control personnel should not become so involved with salt-marsh mosquitoes that basic source reduction within or adjacent to urban areas is neglected.

The most abundant pest species as indicated by light traps was *Psorophora con-*

finnis. This flood-water mosquito is difficult to control in the larval stage, since only 4 or 5 days may be required for larval development during the summer months; thus, a limited amount of time is available for larviciding from inundation of the eggs to adult emergence.

The permanent-water-breeding *Anopheles*, *Culex* and *Mansonia* constituted over 60 percent of the mosquitoes taken, exclusive of the *Uranotaenia*, indicating the need for permanent control measures such as drainage and aquatic vegetation suppression.

The appreciable number of *Culex quinquefasciatus* taken was indicative of large populations of this mosquito, since the light trap has generally been found to be comparatively ineffective in attracting this species. In addition to being extremely pestiferous, *C. quinquefasciatus* is believed to be the principal vector of St. Louis encephalitis in the southern portion of the state. Larval development is heaviest in

waters with high organic content, frequently produced in connection with municipal or individual disposal of sewage or other wastes. Breeding is usually concentrated and the larvae vulnerable to relatively simple and inexpensive control procedures. This common house mosquito should receive primary consideration in formulating and applying control measures. In areas of St. Louis endemicity, it is advisable that cities or counties with inadequate budgets institute species control measures against *C. quinquefasciatus*. Since it invades dwellings and attacks man freely, it is a major pest species, as well as a disease vector.

SUMMARY. Three light traps were operated in the County of Orange, Texas, from May 1 to September 10, 1958. A total of 18,076 mosquitoes were taken in 148 trap nights. Less than 10 percent of the mammal-biting species were *Aedes sollicitans* and *A. taeniorhynchus*.