

MOSQUITOES COLLECTED IN THE MEXICAN STATES OF TAMAULIPAS AND SAN LUIS POTOSI

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A collecting trip was made to the States of Tamaulipas and San Luis Potosi, Mexico, August 21-25, 1961, with the kind assistance of Dr. Luis Vargas, Instituto de alubridad y Enfermedades Tropicales Mexico, D.F. Although only a short time could be spent on this study, some interesting information was obtained concerning the mosquitoes in several ecological situations.

Three Mexican geographic regions are near the Texas border, the Gulf Coastal plains, the Sierra Madre Oriental and the Mexican Plateau, which makes up much of Mexico. The Sierra Madre Oriental forms a rim or ridge of hills and mountains along the eastern edge of the Mexican plateau. The main crest averages somewhat under 5,000 feet, although some peaks are considerably higher. The Gulf Coastal Plains is a relatively level area seldom over 150 feet in elevation extending westward from the Gulf of Mexico to the Sierra Madre Oriental. Our collections were made in the Gulf Coastal plains around Tampico, and on the eastern slopes of the Sierra Madre Oriental around Valles, Mante and Ciudad Victoria. This area is transitional between the nearctic and neotropical realms, and is characterized by considerable differences in elevation, precipitation and temperature. The neotropical region may be divided into two life zones: the Upper Tropical life zone, which includes the slopes of the Sierra Madre; and the Lower Tropical zone, encompassing the Gulf coastal plains. South of Valles the Upper Tropical life zone extends to a low elevation. The Sierra Madre Oriental lies to the south as well as to the west, forming a pocket where precipi-

tation is heavy and the humidity high, resulting in some rather dense forests.

TAMPICO. Tampico is at an elevation of 39 feet, and the annual rainfall is 41.7 inches; most of the rain falls in the summer and fall, especially in September. There are a number of fresh-water lakes, as well as considerable fresh and brackish water marshland, in the immediate vicinity. A New Jersey type light trap operated near Laguna del Chairel, the source of the city water, took numerous *Culex pipiens*, with lesser numbers of *C. erraticus*, *C. coronator*, *Anopheles albimanus*, *Aedes taeniorhynchus* and *Uranotaenia lowii*. Biting collections made at dusk and after dark at several locations indicated that *A. albimanus* and *Ae. taeniorhynchus* were abundant and pestiferous species at the time of our visit. This point was impressed on us as both species attacked us in numbers while we were sitting in the lobby and patio of our hotel in downtown Tampico. In a wooded area outside the city, *Ae. taeniorhynchus* and *Ae. scapularis* were collected during the day while biting.

A larval survey within the city indicated that *C. pipiens* was common in artificial containers of water. Dipping along the periphery of Laguna del Chairel produced *A. albimanus*, *C. nigripalpus*, *C. inhibitor*, *C. erraticus* and early instar *Uranotaenia* larvae. *A. albimanus* and *C. inhibitor* were taken outside the city from semipermanent roadside pools.

VALLES. Valles is at an elevation of 312 feet, some 80 miles inland from Tampico. Biting, or landing, collections were made for three nights from 9 to 10 p.m. by one person. Taken were 20 *A. albimanus*, 14 *A. pseudopunctipennis*, 12 *Ac. terreus*, 8 *C. (Melanoconion) sp.* and 3 *Psorophora confinnis*. Landing collections and insect net sweepings were also

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made on one of the mountains near Valles, which was an estimated 3,000 feet in height, and densely covered with forest. The collections were made about every 500 feet. Considerable specific variety was encountered, although large numbers were not seen. Two collectors took a mosquito every three or four minutes, between them, during daylight hours. At the lower and middle mountain elevations the most abundant landing mosquito was *Ae. terreus*, with small numbers of *Ae. scapularis*, *Ae. trivittatus*, *Ae. euplocamus*, *Ae. serratus*, *P. jerox* and *Wyeomyia* spp. At the upper levels the most common mosquitoes alighting on the collectors were *Wyeomyia* spp., with lesser numbers of *Ae. terreus* and *Haemagogus* sp.

The only water found on the mountain was in tree holes. Fifty *Ae. terreus*, several late instar *Toxorhynchites ruiilis*, and one *Haemagogus regalis* larvae were siphoned from three tree holes. At regular ground level in the vicinity of Valles, considerable mosquito breeding was found. *Ae. terreus* was taken repeatedly from rot cavities or depressions in several species of trees in both wooded areas in dense shade and scattered about in relatively clear, sunlit situations. It was also found in bamboo stumps. A small, flowing stream was examined which contained *Culex* in numbers suggestive of *C. pipiens* in sewage effluent. Foot-high Bermuda grass along the margins which had been mowed, and which had fallen into the water, appreciably slowed the flow. In this rich medium, *C. corniger* was the principal species, with lesser numbers of *C. chidesteri*, *C. interrogator*, *C. nigripalpus* and *C. sp.* (prob. *mollis*). Several semi-permanent roadside ditches of water with grassy margins were examined and *C. corniger*, *C. interrogator*, *C. nigripalpus*, *P. confinnis* and *Ae. scapularis* were taken.

MANTE. Dippings made from several roadside pools of clear water with grassy margins near Mante averaged ten larvae per dip. Species taken were *P. discolor*, *P. howardii*, *P. confinnis*, *C. pilosus*, *C. salinarius* and *C. nigripalpus*. One tree

hole was discovered in this vicinity containing water and numerous *Ae. terreus* larvae.

CIUDAD VICTORIA. Ciudad Victoria has an annual rainfall of approximately 30 inches and is at an elevation of 1053 feet. Average monthly temperatures for January are 65.1° F. and 85.6° F. for August. Little standing water other than stock pond was in evidence during our visit. On almost dry pool of muddy water was found along the Victoria-Brownsville highway which contained myriads of *P. signipennis*, with a few *P. discolor*, *P. confinnis* and *P. howardii*.

DISCUSSION. Mosquitoes have been collected in three distinct ecological areas in Mexico adjacent to the Texas border. Included were the Gulf Coastal Plains around Tampico, the slopes of the Sierra Madre Oriental from Ciudad Victoria to Valles, and one of the Sierra Madre Oriental peaks some 3,000 feet in height near Valles. Approximately 30 species of mosquitoes were collected, as listed in Table 1. A more definite figure cannot be given as only generic identifications can be made of some of the females taken while biting or attempting to bite. Species collected which are not known to occur in the United States are *Ae. serratus*, *Ae. euplocamus*, *Ae. terreus*, *H. regalis*, *C. corniger*, *C. inhibitor* and the *Culex* identified as probably *mollis*. The *Wyeomyia* collected were all females and it is not known if species not found in the United States were involved. Species collected which are present elsewhere in the United States, but not in Texas at this time included *A. albimanus* and *C. pilosus*.

Of particular interest to us during the Mexican collecting trip were the mosquitoes present in the study area which are not known to be established in the Lower Rio Grande Valley of Texas, but which are sufficiently abundant and adaptable enough in their breeding habits to be introduced by natural dispersal. We were impressed with the abundance of *A. albimanus* in Tampico and the lower elevations around Valles, only 250-300 at

TABLE I.—Mosquitoes collected in the Mexican states of San Luis Potosi and Tamaulipas, August 21–25, 1961.

Species	Adults			Larvae				
	Biting	Light trap	Tree holes	Bamboo stumps	Temporary	Semiper-	Small*	Per-
					ground pools	manent ground pools			stream	manent water
<i>Ae. euplocamus</i>	X	..	..	..	..	..	..	..
<i>Ae. scapularis</i>	X	..	..	..	..	X	..	..
<i>Ae. serratus</i>	X	..	..	..	..	..	..	..
<i>Ae. terreus</i>	X	..	X	X	..	..	..	..
<i>Ae. trivittatus</i>	X	..	..	..	..	..	..	..
<i>Ae. taeniorhynchus</i>	X	X	..	..	..	..	..	..
<i>A. albimanus</i>	X	X	..	..	..	X	..	X
<i>A. pseudopunctipennis</i>	X	..	..	..	..	..	..	..
<i>A. chidesteri</i>	..	..	..	..	..	X	X	X
<i>A. corniger</i>	..	..	..	..	..	X	X	X
<i>A. coronator</i>	..	X	..	..	..	..	..	..
<i>A. erraticus</i>	..	X	..	..	..	..	..	X
<i>A. inhibitor</i>	..	X	..	..	..	..	..	X
<i>A. interrogator</i>	..	..	..	..	..	X	X	X
<i>A. pilosus</i>	..	..	..	..	..	X	..	..
<i>A. pipiens</i>	..	X	..	..	X	..	..	..
<i>A. sp. (prob. mollis)</i>	..	..	..	..	..	..	X	..
<i>A. nigripalpus</i>	..	..	..	..	..	X	X	X
<i>A. salinarius</i>	..	..	..	..	X	X	..	..
<i>Ae. magogus</i> sp.	X	..	..	..	..	..	..	..
<i>A. regalis</i>	..	..	X	..	..	..	..	..
<i>A. tansonia</i> sp.	X	..	..	..	..	..	..	..
<i>A. confinnis</i>	..	..	..	..	..	..	..	..
<i>A. discolor</i>	..	..	..	..	X	..	..	..
<i>A. ferox</i>	X	..	..	..	..	..	..	..
<i>A. howardii</i>	..	..	..	..	X	X	..	..
<i>A. signipennis</i>	..	..	..	..	X	..	..	..
<i>A. rutilis</i>	..	..	X	..	..	..	..	..
<i>A. ranotaenia lowii</i>	..	X	..	..	..	..	..	X
<i>A. ranotaenia</i> sp.	..	..	..	..	..	..	..	X
<i>Cy. myia</i> sp.	X	..	..	..	..	..	..	..

* Small stream of clear water with flow greatly reduced by recently cut marginal Bermuda grass.

ne miles from Brownsville. This important vector of malaria in the Caribbean was once abundant in Texas. It was first reported by Dyar, in 1928, who provided the information that R. L. Turner collected 20 of these mosquitoes in Brownsville, McAllen and Pharr in 1923. Public Health Service Division of Foreign Quarantine records indicate that *A. bimanus* was a dominant species around Brownsville during the 1930's and early 1940's. Favorite adult resting places included dairy barns, stables and chicken houses. During the period of high adult densities in the Lower Rio Grande Valley, larvae were also abundant in such loca-

tions as shallow seepage or overflow pools along irrigation canals.

The high seasonal populations of *A. albimanus* in south Texas began to diminish in 1947. No adults or larvae have been taken in Cameron County since October, 1957. Reasons for the apparent disappearance of this mosquito are not known. Cameron County is semiarid, with an average annual rainfall of 29.6 inches, but irrigation practices in effect provide an abundance of favorable developmental sites. Average monthly temperatures range from 60.5° F. in January to 81.4° F. in August at Brownsville. These moderate temperatures would suggest the possibility

of a continuous *albimanus* developmental cycle. However, this does not seem to have happened, except on a small scale during occasional unusually mild winters. In 17 years of light trap operation by Quarantine Station entomologists, only 8 specimens were taken in January, 5 in February, 2 in March and 8 in April. Examination of potential hibernating sites and winter larval dippings were equally unproductive.

It is postulated that both adult and larval *albimanus* are quite sensitive to the sudden temperature drops resulting from short-lived "northers," which in south Texas periodically plunge temperatures to near freezing or below. If this is true, the continued existence of the species in Texas has been dependent upon egg survival during the unusually cold spells or upon adult reintroductions. Few live *albimanus* have been intercepted by quarantine inspectors from planes or ships in recent years, since the adoption of improved aerosols incorporating DDT for disinsectization. As there is no known ecological barrier along the Gulf Coastal Plains between Tampico and Brownsville, it is felt that the large populations in the former city may again spread by natural dispersal into south Texas.

It would seem entirely possible that a second important pest and potential vector species, *Ae. terreus*, might spread by natural means into south Texas. The relative treeless Gulf Coastal Plains would constitute an ecological barrier if development of the species was limited to tree

holes in forested areas. However, around Valles *Ae. terreus* was found both in dense forest and in holes in scattered trees of various species along cultivated fields. The species is adaptable to other types of artificial containers as shown by its recovery from numerous bamboo stumps.

A third species, *C. corniger*, is considered a likely possibility to spread into south Texas by natural means. In the study area it was found to be extremely abundant and adaptable in its breeding habits. It was most prevalent in water rich in organic matter. The species was not taken in our biting catches, even in areas in which larvae were developing in numbers.

It is considered unlikely that the *Wyeomyia* will spread into Texas as their breeding habits would seem to limit them to dense forests with an abundance of broad-leaved airplants. The only common airplant in Cameron County has such narrow leaves that it will not hold water.

SUMMARY. A mosquito collecting trip was made into the Mexican States of Tamaulipas and San Luis Potosi August 21-25, 1961. Approximately 30 species were taken, including several not found in the United States. A discussion is given of the species which are abundant and seem sufficiently adaptable in their breeding habits to spread into south Texas by natural means.

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