THE OCCURRENCE OF SALT MARSH MOSQUITOES
IN THE INTERIOR OF FLORIDA

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The salt marsh mosquitoes of Florida referred to in this paper are *Aedes lauenirhynchos* primarily and *Aedes sollicitans* incidentally. To the best of our knowledge these mosquitoes deposit their eggs on moist ground in low areas which are likely to be flooded at a later date by either tide or rain water. They do not oviposit and develop only in salt marshes. Although the soil where the eggs are laid is usually saline, the water which hatches them is generally fresh rain water. If the greatest producers of these mosquitoes are salt marshes and mangrove swamps, it could justifiably be argued that it is because these are the most available temporary-water habitats in coastal areas and not necessarily because of preferability to the mosquitoes. The same grassy swales, grassy ditches, and other like depressions commonly referred to as rain pools which produce salt marsh mosquitoes in coastal areas produce glades mosquitoes, *Psorophora confrinis*, away from the coast. Without elaborating any further on a complex problem, we might say that the salt marsh mosquitoes appear to be restricted to the coastal strip because of adult requirements rather than of larval ecological limitations. What it is that the adults require which restricts them to the coast we can only surmise, and it is highly probable that a knowledge of these requirements would give us the answer to the riddle of their remarkable flights.

Before discussing exceptional occurrences of salt marsh *Aedes* in the interior of Florida, let us review briefly their normal distribution with respect to coast line. An examination of our data reveals that the presence of adult salt marsh mosquitoes in Florida in annoying numbers beyond four miles from tidewater is exceptional. Arbitrarily, we consider annoying numbers a landing rate greater than one per man per minute or a light trap rate greater than 24 females per night. And by exceptional we mean occurring less than three days out of a year, or 1% of the time. As an example of the close restriction of these mosquitoes to tidewater areas, we have data from

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Broward County in 1948. Twice a week during July and August, landing rates were taken at 22 stations distributed evenly over the populated portion of the county. One row of stations was within two miles of salt water, a second row was parallel to the coast and from three to five miles from tidewater, and a third row was at right angles to the other two rows and ended well within the Everglades 25 miles due west of Ft. Lauderdale. Not a single specimen of salt marsh mosquito was either seen, counted, or collected at any of the stations in row two or row three although they occurred regularly in August at stations in row one. On the Gulf coast, a light trap operated semi-weekly and without interruption for four years at Alva, 10 miles east of tidewater in the Caloosahatchee River, has caught over 24 female Aedes taeniorhynchus three times in 1947, not once in either 1948 or 1949, and three times in 1950. The largest collections were 53 females on June 27, 1947, and 43 females on September 8, 1950. We have a similar record for three years at Myakka River State Park, roughly 10 miles from tidewater in the Myakka River. In 1948, the greatest collection of female Aedes taeniorhynchus was nine. In 1949, there was a collection of 128 on June 28 and one of 40 on July 15. The only collection exceeding 24 in 1950 was one of 40 on July 15. Numerous other trap records verify the general assertion made that more than four miles from tidewater in Florida, Aedes taeniorhynchus in significant numbers is exceptional.

Now we may consider some of the exceptional occurrences of this salt marsh mosquito in the interior of Florida with attempts at explanation. Considering first a locality fairly close to the coast, we have light traps operating semi-weekly at Princeton and Modello just north of Homestead in Dade County. These towns are roughly five or six miles west of the Biscayne Bay coast, which in this area is fairly straight and narrowly fringed with mangrove. In 1948 and 1949, these traps had Aedes taeniorhynchus records almost identical to the ones for Alva and Myakka, across the peninsula. In 1950, both traps swung to salt marsh mosquitoes in quantities typical of tidewater areas. The Princeton trap exceeded 100 female Aedes taeniorhynchus per night 15 times and reached a high of 688 on August 29 and October 3. The Modello trap exceeded 100 per night seven times and reached a maximum of 1800 on August 22. The male of the species never reached 50 per night
at either station. With salt marsh mosquito experience of many years and basing his judgment on the bone-dry condition of known breeding areas and on the failure of his inspectors to locate breeding anywhere near the affected areas, Mr. Fred Stutz, Director of the Dade County Anti-Mosquito District, believes that the Miami area in 1950 was invaded by *Aedes* originating in the Cape Sable and southern Everglades wilderness region, where breeding of salt marsh mosquitoes over tremendous areas is a distinct possibility. If this assumption is correct, these mosquito swarms reached the Miami area, 40 to 80 miles away, by advancing at right angles to the prevailing southeasterly trade winds. In this connection, it is notable that the numbers of salt marsh mosquitoes in the Alva trap mentioned above were synchronized over a four year period with numbers in the great breeding areas of San Carlos Bay, 30 miles to the west. It, therefore, appears that the occurrence of salt marsh mosquitoes in the interior of the southern tip of Florida is best explained as the result of long-distance, swarming flights.

Farther inland, but still in south Florida, we will consider the record for Belle Glade, on the southeast shore of Lake Okeechobee, some 30 miles from the nearest tidewater. A light trap has been operated here by the Agricultural Experiment Station for six years at semi-weekly intervals. For four years, 1945 through 1948, the trap collected only occasional *Aedes taeniorhynchus*. Only two collections exceeded 24 females; 36 on July 23, 1945, and 48 on August 10, 1948. There were only seven collections (largest, nine) in 1946; in 1947 there were only four collections (largest, two). From this scarcity, the same trap in 1949 showed a huge increase in *Aedes taeniorhynchus*. All, however, came within the brief period—June 22 to July 3. Several collections in this period were over 100 females, the largest being 232; the largest male collection was 20. It had all the appearance of being one big brood that had blown in. Previous to June 22 and after July 3, the record was very much as it had been in the four previous years.

We can now discuss the most outstanding occurrence of salt marsh mosquitoes in the interior of Florida. During the years 1942 to 1945, the Army operated light traps at their installations in Sebring and Avon Park. The *Aedes taeniorhynchus* record for these traps is astounding. The nearest tidewater is the head of Charlotte Harbor, 30 miles to the southwest; the
east coast at its nearest (Vero Beach) is 45 miles away. The prevailing summer winds here are southeasterly trade winds. A foretaste of things to come was obtained when traps were first set up in the fall of 1942. Throughout October the traps at Sebring gathered in large numbers of *Aedes taeniorhynchus*, the peak being reached on October 12 when one trap picked up 134 males and 73 females. The identical pattern, though of much smaller numbers, occurred at Dorr Field, halfway between Sebring and Charlotte Harbor. In 1943, two large broods occurred in Sebring. The first and largest lasted from May 31 to June 12 with a maximum of 914 females in one light trap collection. The second brood lasted from June 25 to July 11 with a maximum collection of 145 females. Smaller broods occurred in each month from April to November. Again we find these same two large broods recorded at Dorr Field, the early June one reaching a maximum collection of 271 and the early July brood reaching a maximum of 89 females. During these infestations, there were never as many as ten males in a collection at Sebring. At Dorr Field the males rose to 103 in the early June brood. On the entire Atlantic seaboard there were no *Aedes taeniorhynchus* to match the May 31 to June 12 brood at Sebring and Dorr Fields. On the Gulf coast, there was a big brood culminating on the 1st of May in the Tampa Bay area, but that was a whole month prior to their appearance at Sebring. The only region receiving sufficient rainfall between May 17 and 24 to have produced the mosquito brood was neighboring Polk County, where no salt water occurs. At Sebring and Avon Park, 1944 was a repetition of 1943 except that there was but one large brood lasting from June 2 to June 26. The largest single night’s trap collections of female *Aedes taeniorhynchus* were 348 at Sebring and 1144 at Avon Park. Males were scarce in these collections, the largest numbers being 19 and 3 respectively. As in 1943, this brood had no counterpart on either coast, to our knowledge; and also as in 1943, the only rainfall area properly timed to produce such a brood was in neighboring Polk County. In 1945, there was a large brood in July at Avon Park and Sebring, but this time contemporary broods occurred throughout peninsular Florida including the interior where local record collections of *Aedes taeniorhynchus* were made at such widely separated points as Clewiston (365) and Leesburg (37). At the proper time previous to this big brood, there had been torrential rains all over
Florida, although again Polk County led with a record of 12.52 inches of rain at Lake Wales on June 24.

Northward in the interior of Florida, collections of *Aedes taeniorhynchus* become less frequent and smaller. Traps operated at such points as Bartow, Lake Wales, Kissimmee, and Orlando usually bring in a dribble of salt marsh mosquitoes, but never as much as 24 per night or even near that. At Leesburg a large number of traps were operated daily in 1948 and 1949. The largest single collection of female *Aedes taeniorhynchus* in one night was eight on July 19, 1948. Back in 1945, as mentioned earlier, one trap did collect a record of 37. By adding up the totals for all Leesburg traps operating daily in 1948, we arrive at a considerable sample. This readily demonstrates two broods in June and July. It seems more than coincidental that these mosquitoes showed up in Leesburg in both cases within three days of demonstrated huge emergences in the salt marshes of Brevard County, 60 miles away to windward. A third big brood emerged there on August 22 to 24 and was followed by a sharp rise in Leesburg traps on August 31 and September 1.

Proceeding northward from Leesburg, records of salt marsh mosquitoes in Florida's interior soon become exceedingly rare. Intensive trapping in the Orange Lake area in 1950 yielded a maximum night's collection of eight females at McIntosh, and three traps operating almost daily in Gainesville during the summer of 1948 failed to yield a single *Aedes taeniorhynchus* or *Aedes sollicitans*. A very large number of traps operated continuously in the Tallahassee area in 1943 and 1944 yielded only occasional *Aedes taeniorhynchus* and *Aedes sollicitans*, although the extensive salt marshes of Wakulla County are but 20 miles away and the prevailing summer winds are from their direction. The only salt marsh mosquito collection to exceed four in one night was 80 females on July 25, 1944, which was obviously a flight. Orange Lake, Gainesville, and Tallahassee are referred to because they represent intensive trapping. North Florida was fairly peppered with light traps between 1942 and 1945, and evidence of salt marsh mosquitoes at interior points was consistently negligible.

Summarizing the data reviewed, the following tentative conclusions can be drawn concerning the occurrence of salt marsh mosquitoes in Florida: (1) *Aedes taeniorhynchus* and *Aedes sollicitans* are normally restricted to within four miles
of tidewater. (2) Although *Aedes sollicitans* adults have been
collected throughout the interior, only *Aedes taeniorhynchus*
has occurred here in annoying numbers. (3) With one excep-
tion (Avon Park-Sebring), *Aedes taeniorhynchus*, both in fre-
cquency and size of collections, decreases in the interior in a
perfect gradient from south to north. Avon Park is the farthest
north where they have been recorded in nuisance numbers, and
north of Leesburg there are very few light trap collections
exceeding five per night for the interior. (4) Again with the
exception of Avon Park-Sebring, interior occurrence of salt
marsh mosquitoes are explainable as flights from the coasts
and do not necessarily indicate breeding in the interior. (5)
The remarkable numbers of *Aedes taeniorhynchus* in the Avon
Park-Sebring area in 1943 and 1944 are virtually impossible
to explain as invasions from either coast, and most likely
originated somewhere in the interior of Polk County, if not
right there in Highlands County.

As a postscript, we might add that, to our knowledge, there
has been but one proven case of breeding of *Aedes taenior-
hynchus* in interior Florida. That was in Orlando some years
back and was discovered by workers of the Bureau of Ento-
mology and Plant Quarantine.

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