

THE POSSIBLE ENDEMICITY OF *ANOPHELES ALBIMANUS* IN FLORIDA*

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Anopheles albimanus Wiedemann, the most important vector of malaria in the Caribbean region, has been recorded from Florida several times. Gardner (1904) first reported the occurrence of this species in the United States on a basis of collections made by MacDonell in Key West. King (1937) discussed MacDonell's findings and included notes covering these data.

MacDonell's collection consisted of 2 male and 129 female *A. albimanus* taken from a limited section of Key West between July 29 and August 20, 1904. Most of these specimens were taken in stables, although a few were found in residences. No larvae were discovered. According to King, it was suggested by MacDonell that the captured adults were the progeny of a single female, possibly brought by a vessel from Vera Cruz, Mexico. In an abstract of the discussion following this paper, MacDonell stated, "My search was so intensive and thorough that I have reason to believe that I exterminated this breed. In so doing, I probably checked what otherwise might have been an invasion of the Keys and the mainland by the chief vector of malaria in the West Indies."

Griffitts (1931) reported taking *A. albimanus* during inspections of airplanes arriving in Miami from foreign ports. Denning et al. (MS) † recorded the find-

ing of 16 dead specimens of this species during the period July, 1943, through December, 1944, by quarantine inspections of 10,757 aircraft arriving at Miami from foreign ports. Since 1931, quarantine regulations have required that such planes undergo insecticidal treatment either before landing in Miami or immediately thereafter to prevent introduction of obnoxious insects.

There have been very few studies made of the mosquitoes of southern Florida and the Keys, although intensive anopheline surveys were carried on around Army and Navy bases in this area during the recent war. Mulrennan et al. (1945) and Welch (1945) reported the finding of an adult female of *Anopheles (Nyssorhynchus)* sp., probably *albimanus*, in a spider web under a bridge near Morrison Field, West Palm Beach, on August 19, 1943. It was presumed by these writers that the specimen gained ingress to this country by airplane.

Mulrennan et al. (1945) and Carpenter et al. (1945) recorded the finding of a fourth instar larva of *A. albimanus* near the Army Air Base at Boca Raton, on May 16, 1944. An intensive search in this vicinity revealed no other representatives of this species. It was suggested by the former writer that this specimen was among the progeny of a female which was brought from Puerto Rico by airplane.

On January 13, 1946, the present writers discovered a fourth instar larva of *A. albimanus* on the northwestern side of Big Pine Key. An anopheline survey of the Florida Keys was then made during February by Raymond Krueger and Allan Obermuller, but no other specimens of *A. albimanus* were found.

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† Mulrennan, et al. (1945) included some of these data.

The climate of the Keys became increasingly arid during this period. The pool in which *A. albimanus* had been collected was dry and watered areas were found to be scarce.

The single larva of *A. albimanus* was taken in a brackish, roadside pool (pH 8.1) in association with *Culex atratus*, *C. elevator*, and *Uranotaenia lowii*. The pool was small, partially covered with algae, and shaded on the periphery with white mangrove (*Laguncularia racemosa*) and buttonwood (*Conocarpus erecta*).

Big Pine Key is situated at the northern end of the lower Florida Keys. The location is considerably distant from the nearest airport of entry into the United States. According to various natives consulted, there had been no commerce with Big Pine or adjoining Keys by boats from extra-continental limits during the war years.

That *A. albimanus* may become locally abundant in Florida was shown in Key West in 1904. It was not satisfactorily explained, however, that it was immediately controlled by man, since it would seem highly improbable that a species of mosquito which was established in Florida could have been exterminated by so simple an expedient as the hand collection of 131 adults. This would be particularly true of *A. albimanus*, since it is well known that in the Caribbean region only a small proportion of a given population of this species may be found in domestic resting places. The ecological conditions existing in the Florida Keys are very similar to those found in parts of the Greater Antilles, and excellent breeding conditions for *A. albimanus* similarly seem to be present. It has been noted, however, that in northern South America, the southern limit of this mosquito is reached without apparent reason (Rozeboom, 1941).

The fact that *A. albimanus* disappeared in Key West, although it obviously was breeding there, and that no further specimens were found following discovery of this species on Big Pine Key, even though

breeding was demonstrated, indicates that it is very difficult for this species to maintain itself in large numbers in the Florida Keys. The fact that no further specimens were found at West Palm Beach or Boca Raton, even though breeding was demonstrated in the latter case, indicates that it is similarly difficult for this species to maintain itself in peninsular Florida. This evidence tends to minimize fear of the introduction of *A. albimanus* into Florida.

The recent finding of single specimens of *A. albimanus* at West Palm Beach and Boca Raton may be explained on the basis of chance introduction. The finding of a specimen on Big Pine Key, however, leads the writers to believe that the species possibly is endemic to the Florida Keys where conditions are such that it maintains itself only in erratic and extremely limited numbers.

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