

midges contained within an aspirator to be anesthetized with CO<sub>2</sub> gas from the side tube, while previously anesthetized individuals remain immobilized on the surface of the gas stage. The gas stage is readily placed under a dissecting microscope for examination of anesthetized individuals. In our experience, CO<sub>2</sub> concentrations of 40 to 45% are needed to induce and maintain anesthesia in biting midges. This concentration is higher than the reported safe levels of CO<sub>2</sub> for other insects (Edwards and Patton 1965; Harris et al. 1965); we have, however, sorted and identified large numbers of field-captured *Culicoides* at this level of CO<sub>2</sub> with no apparent adverse effects on subsequent survival or blood-feeding behavior.

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- INITIAL RECORD OF ANOPHELES ALBIMANUS IN THE PENINSULA OF BAJA CALIFORNIA, MEXICO
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- During collections made in San José del Cabo, Baja California Sur (BCS), Mexico on January 23, 1979 significant numbers of *Anopheles albimanus* Wiedemann were taken along with lesser numbers of *An. pseudopunctipennis* Theobald. The captures were made by the writer at dusk (1818-1830 hours), with Mr. Antonio Bourgé of Sancaimiento Ambiental Xitlali, S.A. serving as bait. The 15 min collection yielded 29 *An. albimanus*, 5 *An. pseudopunctipennis* and 62 *Culex erraticus* (Dyar and Knab). The site was the margin of a lagoon 3 to 4 acres in area on the outskirts of the town. Later in the evening (1850-1920 hours) the writer collected 27 *An. albimanus*, 13 *An. pseudopunctipennis* and 13 *Culex (erraticus and coronator)* from the posts and wire screen of a goat corral some 200 meters from the human bait site. The following day larvae of the 2 anopheline species were taken in marginal vegetation of the lagoon, along with larvae of *Cx. coronator*. A temporary pool near the lagoon yielded larvae and pupae of *An. pseudopunctipennis* and of *Cx. restuans* and *Cx. interrogator*.
- On January 25 and 26 nocturnal collections with human bait were attempted near an estuary at Nopoló, 8 kms. south of Loreto, B.C.S. but were negative, probably due to strong winds and low temperatures. Larvae of *An. pseudopunctipennis* and of *Cx. tarsalis* were taken on January 26 among algae in the same estuary.
- Several species and subspecies of anophelines have been reported from the Peninsula of Southern California but the listings include no *An. albimanus*. Aitken (1942) reported *An. pseudopunctipennis pseudopunctipennis* Theobald (= *An. pseudopunctipennis*), *An. pseudopunctipennis franciscanus* McCracken (= *An. franciscanus*) and *An. maculipennis freeborni* Aitken (= *An. freeborni*). Downs and Bordas (1949) included entomological data from their malaria survey in Lower California (now the State of Baja California Sur), including San José del Cabo, Santiago, Todos Los Santos and Mulegé. They concluded: "*Anopheles pseudopunctipennis* var. *typicus* is the sole anopheline and the vector of malaria in the region." They mentioned heavy production of *An. pseudopunctipennis* in San José del Cabo, including the lagoon involved in the recent collections of *An. albimanus*. Downs et al. (1951) described a three months' exploration of the B.C.S. area in jeep by one author (ACC) and concluded: "Additional entomological surveys confirmed the presence of *An. p. pseudopunctipennis* as the sole anopheline in the territory. We were not able to confirm Aitken's report of finding *An. p. franciscanus* at Coyote Cove, Concepción Bay, south of Mulegé." Brokman and Reeves (1953) reported *An. freeborni* and *An. franciscanus* from

46 and 65 kms. south of Tijuana and added *An. occidentalis* Dyar and Knab taken as larvae by R. M. Bohart 46 km. south of Tijuana.

Vargas and Martínez-Palacios (1956) listed *An. freeborni* and *An. franciscanus* from Baja California Norte and *An. pseudopunctipennis* and *An. franciscanus* from Baja California Sur. *An. pseudopunctipennis* was listed from the states of Sinaloa and Sonora, across the Sea of Cortés from the peninsula. *An. albimanus* was listed from the State of Sinaloa but not from Sonora. Díaz-Nájera (1967) listed larval collections of *An. pseudopunctipennis* from the peninsula and from Sinaloa and Sonora, but *An. albimanus* only from Sinaloa among these entities. According to Dr. Luis Vargas of the National Malaria Service of Mexico, *An. albimanus* has been found in Guatambampo, Sonora; Mr. Cruz Guerrero-Uriarte, entomology aide of the National Malaria Service in north-western Mexico, states that *An. albimanus* can be found in several coastal areas of Sonora, but preserved specimens are not at hand. The closest record of *An. albimanus* in the United States is that by Eads (1946) who reported captures in light traps near Corpus Christi, Texas.

Dr. John N. Belkin of the University of California, Los Angeles states in a recent personal communication: "Regarding the distribution of *albimanus* on the Pacific side of Mexico, we have seen specimens from as far north as Sinaloa but none from Baja, although considerable collecting has been carried out around La Paz. With the increased traffic between Mazatlán and La Paz by air as well as by boats and ships it is quite possible that it was introduced in this manner."

As to the origin of the recently-found *An. albimanus* population in San José del Cabo, introduction by ship or by ship-borne vehicles from Sinaloa or Sonora is clearly a possibility. There are now car-ferry services to La Paz from Mazatlán and Los Mochis, where *An. albimanus* has been known for many years. However, La Paz is 190 kms. north of San José del Cabo and collections in La Paz have not yielded this species. The car-ferry service from infested Puerto Vallarta, Jalisco to Cabo San Lucas, which is only 30 kms. west of San José del Cabo, offers more direct contact. Even better possibilities are offered by small craft, including fishing boats from infested ports of

Sinaloa, especially if seeking shelter on the beach of San José del Cabo a few hundred meters from the lagoon. There has long been air service to La Paz from many infested points, but recently established air service to the new airport 18 kms. from San José del Cabo again represents more direct contact.

Interestingly, co-author Dr. Eulogio Bordas of the 1949 paper by Downs and Bordas has recently suggested that this species may have been present at minimal levels during the 1948-1950 studies and may have escaped detection.

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