

SCIENTIFIC NOTES

MOSQUITOES RECOVERED FROM MEXICAN SHIPS ENTERING QUARANTINE AT BROWNSVILLE, TEXAS

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The Public Health Service maintains entomological surveillance of international entry points into the United States, with particular emphasis on those in the South. This involves the inspection of international carriers for arthropods of known or suspected public health importance, and regular surveys of the entry points and adjacent areas to detect imported species or known vectors such as *Aedes aegypti* mosquitoes. Control measures are applied when needed.

Aircraft and surface vessels are of chief concern in the possible transportation of insects and related animals, since they are responsible for much of our international traffic. In the days of sailing vessels, with open water tanks in which mosquitoes could propagate, ships were considered an important factor in the dispersal of these insects (Hughes and Porter, 1956). Modern ships, with closed water systems and improved sanitary conditions, are not generally considered problems in this respect, unless carrying special cargoes such as old tires or unprocessed scrap metal which may be holding rain water.

An interesting opportunity was afforded us in 1963 to evaluate further the importance of ships in the transportation of adult mosquitoes. During the year, three oil tankers were exclusively engaged in regular runs carrying crude oil from Coatzacoalcos, and Tampico, Mexico, to Port Brownsville. The round trip of approximately 1,300 miles from Brownsville to Coatzacoalcos, the most distant of the two ports in Mexico visited, normally required 8 to 10 days. Each of the ships was inspected at least once a month, and frequently two or three times. Consequently, we knew that mosquitoes recovered from these ships entered at one of the two Mexican ports or at Brownsville, and the approximate date. Tankers are relatively simple to inspect for mosquitoes and other insects as there is little open area below the main decks in which they might hide.

A total of 767 dead mosquitoes of at least 41 species were recovered from the tankers during 1963. The species and numbers taken are as follows: *Anopheles albimanus* (24); *A. vestitipennis* (13); *A. crucians* (5); *A. quadrimaculatus* (4); *Aedeomyia squamipennis* (10); *Aedes sollicitans* (149); *Ae. taeniorhynchus* (88); *Ae. scapularis* (12); *Culex salinarius* (190); *C.* (*Culex*) sp. (23); *C. restuans* (20); *C. quinquefasciatus* (14); *C. tarsalis* (9); *C. chidesterei* (8); *C.* (*Melano-*

conion) sp. (8); *C. coronator* (3); *C. corniger* (3); *C. nigripalpus* (3); *C. erraticus* (3); *C.* sp. (near *inhibitor*) (2); *C. opisthopus* (1); *C. pilosus* (1); *C. declarator* (1); *C. interrogator* (1); *C. iolambdis* (1); *C. conspirator* (1); *C. phlogistus* (1); *Culiseta inornata* (10); *Democerites pseudus* (9); *D. mathesoni* (3); *Mansonia titillans* (88); *M. indubitans* (1); *M. nigricans* (1); *Psorophora confinnis* (6); *P. discolor* (4); *P. cyanescens* (2); *P. ciliata* (2); *P. lutzii* (1); *Uranotaenia* sp. (near *pallidoventer*) (17); *U. lowii* (9); *U. leucoptera* (2); *U. geometrica* (2) and *U. nataliae* (2).

DISCUSSION.—Particular attention has been paid to entomological inspections of the oil tankers as the Mexican area in question has many mosquito and other vector species not found in south Texas. In consideration of the relatively short distance between the ports, it was suspected that a regular disinsectization program would have to be instituted for the ships prior to their admittance to the Port of Brownsville.

This has not been necessary. The Mexican officers and crews have told us that mosquitoes are extremely annoying on board ships during loading in the two Mexican ports. Our first inspections confirmed this, as numerous specimens were recovered, many of which were not indigenous to south Texas. Apparently the mosquitoes enter the ships inadvertently or are attracted to the lights while in search of a blood meal. However, no live mosquitoes were taken. Evidently, on leaving the Mexican ports the mosquitoes remaining aboard flew, or were blown away, or were killed by insecticides applied by crew members while enroute to Brownsville.

Of the 41 species taken from the tankers, 14 are not known to have ever been established in Texas. They are *Anopheles vestitipennis*, *Aediomyia squamipennis*, *Culex corniger*, *C. phlogistus*, *C. iolambdis*, *C. opisthopus*, *C. conspirator*, *Mansonia indubitans*, *M. nigricans*, *Psorophora lutzii*, *Uranotaenia* sp. (near *pallidoventer*), *U. leucoptera*, *U. geometrica* and *U. nataliae*.

Four of the 41 species recovered, *Anopheles albimanus*, *Culex chidesterei*, *C. interrogator* and a *Culex* resembling *inhibitor*, have been established in Cameron County, but are not detectable now by standard survey methods. *Anopheles albimanus* was a common species, with large fall populations, in and around Brownsville in 1930-1945. The high seasonal populations began to diminish in 1947, and we have seen no larvae or adults since October, 1957. *Culex interrogator* larvae were taken as far north as the Rio Grande City area in Starr County, Texas, by Malaria Control in War Areas personnel (U. S. Public Health Service). However, to our knowledge, it has not been recovered here since 1945. *Culex chidesterei* has been a common species in permanent to semi-permanent water in Cameron County. We have

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not taken either larvae or adults since December, 1960. To our knowledge, *Culex inhibitator* has not been reported in the literature from Texas or the United States. However, a review of the *Melanconion* in the Quarantine Station collection has shown the specimens determined as *peccator inhibitator*. The specific status of this mosquito cannot be clarified until associated larval and pupal skins and male genitalia can be obtained. Unfortunately, this mosquito has not been seen since November, 1960, in Cameron County. Males, apparently of this mosquito, have been taken from the Mexican tankers.

SUMMARY.—Oil tankers on regular runs between two Mexican Gulf coast ports in Mexico and Brownsville have been inspected for mosquitoes and other insects in 1963 to prevent the introduction of nonindigenous species. At least 41 species of mosquitoes were collected, including 14 which have not been established in south Texas and 4 additional ones previously recorded but not believed to be in the area now. All of the mosquitoes taken were dead.

Literature Cited

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OCCURRENCE OF *Culicoides paraensis* (GOELDI) (DIPTERA: CERATOPOGONIDAE) IN NORTHERN FLORIDA

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Studies on the bionomics of certain inland species of *Culicoides* in Alachua County, Florida supported by the National Institutes of Health Grant GM 12322-01, revealed the presence of *Culicoides paraensis* (Goeldi) which to our knowledge has not previously been reported from Florida. Snow *et al.* (1957, 1958) found this species in the Tennessee Valley regions of Tennessee, Alabama, and Mississippi breeding in the wet debris in oak tree holes. Wirth and Blanton (1959) reported that it was widely distributed in South and Central America and the West Indies from Argentina and Bolivia to Mexico and the eastern United States.

Our collections were taken from tree holes in magnolia (*Magnolia grandiflora* L.) trees located in the San Felasco Hammock about five miles northwest of Gainesville, Florida. A sample collected on October 6, 1964 and held in the laboratory at 72-74° F. produced 16 adults in 33 to 56 days. Three other samples collected on October 27, 1964 produced seven adults in 33 to 82 days. An associated species, *C. nanus* R & H,

emerged from the same samples in larger numbers.

C. paraensis is a pestiferous, diurnal, man-biting species showing a preference for the higher canopy regions of forests where it disperses after migrating upwards on tree trunks during the day (Snow, 1955). It is a typical member of the *C. debilipalpis* Lutz group (Wirth and Blanton, l.c.) and its wing pattern is very similar to that of *C. stellifer* (Coq.).

Identifications of *C. paraensis* specimens were verified by Dr. F. S. Blanton, University of Florida Entomology Department.

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SUGAR-BAITED INSECTICIDE RESIDUES AGAINST MOSQUITOES

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Fay and Kilpatrick (1958) have reviewed the use of bait formulations combining organic insecticides with sugar or syrup for fly control. The importance of sugar-feeding to female mosquitoes in the field may have been obscured by the blood-feeding habit with its consequent relation to disease vectoring. Nevertheless, laboratory colonies and experimental adults are routinely provided with sugar or honey solutions or even dry sugar crystals (Eliason, 1963).

Several years ago I evaluated some materials as attractants for mosquitoes among which I included sucrose. Sucrose or "Karo" syrup was found to markedly enhance the effectiveness of residual deposits of either DDT or malathion against *Aedes aegypti*, whether the residual deposit was on paper, wood, or bean foliage. Subsequent laboratory experience has shown that the sugar-baits can be evaluated better in large cages than in small cages of the WHO-type.

The results of one type of large cage test are reported here, as they suggest the potential usefulness of sugar-baited insecticide residues in mosquito control. The procedure in this test was to treat pieces of filter paper by dipping them in a water emulsion of either the toxicant alone or of