SCIENTIFIC NOTES

Aedes thibaulti IN MARYLAND *

STANLEY R. JOSEPH

University of Maryland and Maryland State Board of Agriculture, Salisbury, Maryland

Aedes thibaulti Dyar and Knab has been reported from Cape Henry, Virginia, and from Ellendale Swamp, Delaware (Bickley, 1957). It is reasonable to assume that this species should be present in the section of Maryland which lies between these two locations. However, there is no record of this species having been collected in Maryland prior to this report.

On April 27, 1961, a number of 4th instar larvae and pupae were collected from a hole under the root system of a partially uprooted tree in Dublin Swamp, Somerset County, Maryland. At first, dipping in this hole produced only *Aedes canadensis* larvae but when the samples were taken from the darkest portion of the hole *A. thibaulti* larvae were found. Three adult males were reared from this collection confirming identification of the larvae.

A second collection of this species was made on the same date in a swamp about two miles east of the first site. This time the larvae (2nd and 3rd instar) were found in a large tree hole which was nearly a foot in diameter and extended slightly below the surface of the surrounding terrain.

A third collection of a single adult male was made May 21, 1961, from a resting box in a swamp six miles southwest of Salisbury, Wicomico County, about thirteen miles west of the first site.

During a second visit to the areas in Somerset County, *Culiseta melanura* larvae were found associated with this species at both of the breeding sites. This association has been reported by Shields and Lackey, 1938.

Literature Cited

BICKLEY, W. E. 1957. Notes on the distribution of mosquitoes in Maryland and Virginia. Mosquito News 17:22–25.

SHIELDS, S. E. and LACKEY, J. B. 1938. Conditions affecting mosquito breeding with special reference to *Aedes thibaulti* Dyar and Knab (Diptera, Culicidae). Jour. Econ. Ent. 31:95–102.

* Miscellaneous Publication Number 431, Contribution Number 3262 of the Maryland Agricultural Experiment Station, Department of Entomology. [Project H-73-a].

UNUSUAL LARVAL MOSQUITO RECOVERIES FROM FIRE BARRELS

R. B. EADS,[1] H. A. TREVINO,[2] AND E. G. CAMPOS [2]

Among the most important container mosquito breeding habitats around seaports such as Brownsville, Texas, are the barrels of water maintained for fire protection in cotton warehouses. These fire barrels are checked regularly for the presence of vector species, particularly *Aedes aegypti*, and control measures are applied as needed. *Aedes aegypti* may be produced in large numbers in such containers in the absence of control measures. Although the predominant species taken is *Culex pipiens quinquefasciatus*, we are continually impressed by the number of different species found.

Diverse aquatic habitats are likely to harbor characteristic species of mosquitoes; some are limited to a single peculiar breeding environment, while others are found in a great variety of aquatic situations. The ecological distribution of larvae in nature results largely from adult oviposition habits, rather than from inability of the larvae to develop normally in water with a wide range of physical and chemical properties (Bates, 1949). We have previously collected *Culex salinarius, C. coronator, C. tarsalis, C. p. quinquefasciatus, Culiseta inornata, Anopheles quadrimaculatus, A. crucians,* and *A. pseudopunctipennis* from fire barrels in Brownsville, Texas. These adults lay their eggs directly on water surfaces and the presence of their larvae in artificial containers of this type is not surprising. However, our recent recovery of three species of flood-water mosquitoes from fire barrels in a cotton warehouse is deemed of sufficient interest to report. On Oct. 6, 1960, six larvae of *Aedes sollicitans* and two of *Aedes taeniorhynchus* were taken from three fire barrels. A large number of the barrels were also breeding *C. p. quinquefasciatus*. Only a sample of the *Aedes* present was taken for determination. On Oct. 20, four *Aedes sollicitans* and one *Psorophora confinnis* were dipped from a single barrel. Three *Aedes sollicitans* larvae were obtained during a third visit Oct. 24. All were third or fourth instar.

These *Aedes* and *Psorophora* species normally oviposit on moist soil, with the embryos developing to the point of hatching and entering a resting stage until reactivated by flooding. This adaption to temporary ground water would normally pre-

[1, 2] Senior Scientist (R) and Biologists, respectively, Quarantine Station, Public Health Service, U. S. Department of Health, Education and Welfare, Brownsville, Texas.

vent them from breeding in relatively permanent water accumulations.

The fire barrels considered are concrete cylinders with inside measurements of 18 inches in diameter and 34 inches in height. The cylinders are filled approximately once a year with water from the Brownsville water mains. Evaporation in the barrels is at the rate of an inch or two a month. It was theorized initially that adults of *Psorophora confinnis* and the two *Aedes* laid eggs at the water line and that the eggs hatched subsequent to the water levels being raised. However, it was learned that water had not been added to the barrels for at least six months. Consequently, the eggs must have dropped off the sides of the barrels or were laid directly in the water. Travis (1953) reported that eight percent of one lot of *Aedes sollicitans,* submerged in tap water within 24 hours after being laid, hatched within eight days, without an interval of drying.

The 40 fire barrels in the warehouse in question were filled with tap water Nov. 4, 1960, and checked every few days the remainder of the month. No *Aedes* were detected until Nov. 22, when second and third instar *sollicitans* were collected in four barrels. There were only a few larvae in three of the barrels, while the fourth contained more than 100 specimens.

We are unable to advance an explanation as to why these flood-water mosquitoes chose to oviposit in fresh-water fire barrels, particularly in view of numerous roadside ditches in the vicinity which are subject to periodic inundation and which are typical of their normal breeding habitats.

References

BATES, M. 1949. The Natural History of Mosquitoes. The Macmillian Co., New York. 379 pp.

TRAVIS, B. V. 1953. Laboratory studies on the hatching of marsh-mosquito eggs. Mosq. News 13(3):190–198.

RELATION OF TEMPERATURE AND HUMIDITY TO WINTER SURVIVAL OF *Culex pipiens* AND *Culex tarsalis* [1]

G. ALLEN MAIL AND ROBERT A. MCHUGH

As an adjunct to studies of the overwintering habits of mosquitoes, observations were made on the survival of females of *Culex pipiens* and *Culex tarsalis* that were collected in a mine tunnel near Farmington, Utah, in January and in December, 1957, and subsequently placed under constant conditions of temperature and humidity. A previous study of this mine (Dow, Mail, and Richards, 1957) reported high mortality in the hibernating mosquitoes. Consequently, both lots of material used in the present study had probably consumed, when collected, more than the normal amount of hibernating fat.

The first series of observations was made on 46 *Culex pipiens* and 47 *Culex tarsalis* that were collected on January 16, 1957. The specimens of each species were divided into 3 aliquots and placed in three constant temperature cabinets held at 27° F., 37° F., and 47° F. The relative humidity in each cabinet was 35–40 percent. The percent mortality was observed at 5, 7, 9, 15, 21, 30, and 40 days. At each observation, the specimens were exposed briefly to higher temperatures to determine which ones were dead. At 27° F., 37° F., and 47° F., all specimens of *C. pipiens* were found dead on the 21st, 9th, and 21st day, respectively; all specimens of *C. tarsalis* were found dead on the 40th, 40th, and 21st day, respectively. The estimated 50 percent survival period (Fig. 1) ranged from 4 to 23 days.

During the following December, further collections of *C. pipiens* and *C. tarsalis* were made in the same mine, and observations were begun in the same cabinets. In this part of the study, the temperatures used were 27° F., 32° F., and 37° F., and the air was specially humidified. The 27-degree cabinet was lined on the bottom and sides with slabs of ice from frozen ponds, and pieces of ice were loosely stacked in spaces not occupied by the mosquito cages. The relative humidity was kept at 84 percent. In the 32-degree cabinet, which had a relative humidity of 87 percent, shallow enameled pans filled with a concentrated solution of zinc sulfate were loosely stacked with one-inch-square wooden strips between them. In the 37-degree cabinet, with relative humidity of 86 percent, there were pans arranged as in the 32-degree cabinet but filled with water. The humidity was measured by a model HA-2 Friez [2] psychrometer which had to

[1] From the Encephalitis Section, Technology Branch, Communicable Disease Center, Public Health Service, U. S. Department of Health, Education, and Welfare, Greeley, Colorado.

[2] Use of trade names is for identification purposes only and does not constitute endorsement by the Public Health Service.