

A FIRST REPORT OF THE GENUS *CULISETA* FELT IN MALAYSIA (*Diptera: Culicidae*)

by

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THE DISTRIBUTION of the mosquito genus *Culiseta* Felt (Diptera: Culicidae) is predominantly holarctic and Australian with Ethiopian and Oriental representation (Belkin, 1962). This note marks the first record for the genus in Southeast Asia.

The species observed in Malaysia is previously undescribed and a full description is in preparation by the authors. Characters of the fourth instar larval stage, most reliable for subgeneric classification in this genus, tentatively place the species in the subgenus *Climacura* Howard and Knab. This subgenus is represented by only three species with widely disjunct distributions: *Culiseta melanura* (Coquillett) in the eastern and central United States of America, *Culiseta tonnoiri* (Edwards) in New Zealand, and an undescribed species in Australia (Belkin, 1962).

Four species of the genus *Culiseta*, including two in the subgenus *Climacura*, have been reported

as vectors or potential vectors of arthropod-borne viruses (arboviruses). These viruses include three members of arbovirus group A, one of group B, one of the Bunyamwera group, two of the California group, and one ungrouped.

Eastern equine encephalomyelitis, in group A, is responsible for a severe, often fatal, disease in man and other animals in nearctic and neotropical areas. The virus has been recovered from *Culiseta melanura* (Chamberlain *et al.*, 1951; Holden *et al.*, 1954) and this species is considered an important vector. In the 1959 epidemic and epizootic in New Jersey, U.S.A., *C. melanura* was one of the most abundant mosquitoes reported and it was considered the primary sylvan vector of the virus responsible for carrying it from enzootic swamp foci to areas of human activity (Hayes *et al.*, 1962).

Western equine encephalomyelitis virus is another important group A virus responsible for severe disease in man and domestic animals in nearctic and neotropical areas. The virus has been isolated from *Culiseta (Culiseta) inornata* (Williston) in the United States and Canada (Hammon *et al*, 1945; Spalatin *et al*, 1963) and from *C. melanura* in the United States (Hayes *et al*, 1961). Experimental laboratory transmission has been demonstrated in *C. inornata* and in *C. (Culiseta) incidens* (Thomson) (Hammon and Reeves, 1943a).

Another group A arbovirus, Whataroa, was recently isolated in New Zealand from *Culiseta tonnoiri* (Ross *et al*, 1963). Whataroa virus is very closely related to Sindbis virus, which occurs in Malaysia, and neutralizing antibody to Whataroa have been demonstrated in humans in New Zealand, Fiji, Samoa, and Australia (Ross *et al*, 1964; Maguire *et al*, 1967).

St. Louis encephalitis, an important group B arbovirus infection in the New World, has been experimentally transmitted by *Culiseta inornata* and *C. incidens* (Hammon and Reeves, 1943b).

Cache Valley virus which is found in the New World, was first isolated from *Culiseta inornata* mosquitoes in the United States (Holden and Hess, 1959). It was subsequently placed in the Bunyamwera group by Casals and Whitman (1960). One member of the Bunyamwera group, Batai virus, occurs in Malaysia.

Two new arboviruses, Jamestown Canyon and Jerry Slough, have recently been placed in the California encephalitis group (Sather and Hammon, 1967). Jamestown Canyon virus was isolated from *Culiseta inornata* mosquitoes in the United States (LaMotte, 1968). Jerry Slough virus, which was first reported as very closely related to Trivittatus virus (Reeves, 1964), was also isolated from *C. inornata* mosquitoes in the United States (Reeves, 1968).

The Flanders strain of Hart Park virus, an ungrouped arbovirus, was isolated in the United States from *Culiseta melanura* mosquitoes (Whitney, 1964).

Adult mosquitoes of the Malaysian species of *Culiseta* were collected in two fresh-water peat-swamp forest habitats near Batang Berjuntai and Tanjung Rabok in Selangor. An adult female was first observed in collections taken by electrical hand vacuum sweepings of dense low vegetation and

TABLE I
SPECIMENS OF *CULISETA* SP. COLLECTED IN TWO FRESH-WATER PEAT-SWAMP FORESTS IN MALAYSIA, 1968

| Date | Man Hours | No. of Females | No. of Males | Locality |
|------------|----------------|-------------------|--------------|-------------------|
| 30 April - | $\frac{1}{2}$ | 2 | — | B.B. ¹ |
| 2 May - | 1 | 3 | 2 | B.B. |
| 7 May - | 1 | 1 | 2 | T.R. ² |
| 9 May - | 2 | 1 | 3 | B.B. |
| 14 May - | 1 | 2 | 4 | T.R. |
| 21 May - | 2 | 4 | 5 | T.R. |
| 22 May - | $\frac{1}{4}$ | 3(2) ³ | 4 | T.R. |
| 23 May - | 1 | 9(1) | 12 | T.R. |
| 18 June - | $2\frac{3}{4}$ | 1(1) | 5 | T.R. |
| 19 June - | $\frac{1}{4}$ | — | 1 | T.R. |
| 21 June - | 2 | 3 | 3 | T.R. |
| 25 June - | 2 | 9(6) | 8 | T.R. |

1. Batang Berjuntai, Selangor.

2. Tanjung Rabok, Selangor.

3. 3 females of which 2 were engorged or gravid.

crevices in the root systems of swamp trees. Subsequent collections of adults by this method have produced low but relatively consistent numbers (Table I). Other collection methods, including the use of human and animal bait, have not been successful in recovering specimens of this species.

Larval habitat searches have failed to locate the breeding sites in nature. Gravid females collected in the swamps however, have deposited eggs in plastic oviposition containers with distilled or swamp water in the laboratory. Eggs were deposited in clusters of approximately 30 to 100. Larvae have been reared in the laboratory to the fourth instar, but mortality in the early larval stages has been high and the fourth instar larvae have failed to pupate.

The potential importance of this new species *Culiseta (Climacura)* as a vector of arboviruses in Malaysia indicate a need for further studies. Samples of specimens collected are presently being tested for arboviruses.

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