

PICTORIAL KEYS TO THE MOSQUITOES OF MEDICAL IMPORTANCE III. MALAYA

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The accompanying keys continue a series being prepared under a transfer of funds from the Department of the Army to the Bureau of Entomology and Plant Quarantine, which are designed primarily to assist public-health workers in rapidly separating and identifying the mosquito species of primary medical importance (Mosquito News, vol. 13, no. 1, March 1953). The keys are so constructed that they separate the important species not only from each other but also from all other species known to occur in the area concerned. Suggestions and comments will be welcomed, particularly from persons having information on the faunas of the countries involved.

Although 48 species of *Anopheles* are known from Malaya, only 8 are especially important as vectors of malaria. *A. sudaicus* and *A. minimus minimus* are of great importance wherever they occur. The former is typically a brackish-water breeder and occurs along the entire coast, where it is responsible for the extensive endemic malaria present there. *A. minimus minimus* breeds throughout Malaya in slow-running, partly shaded streams and springs. *A. minimus flavirostris*, although an important vector in the Philippines, is extremely rare in Malaya. The larvae of *flavirostris* and typical *minimus* are virtually indistinguishable. *A. maculatus*, an extremely important vector, inhabits foothill regions near coastal areas and prefers sunlit breeding places, entering cleared areas to replace those species, such as *umbrosus*, which prefer shaded sites. The latter is also an important vector, but is restricted to jungle swamps and their immediate vicinity in the plains region. *A. letifer*, a close relative, is one of the most

economically important vectors, breeding and transmitting malaria to a high degree in plantations in the flat coastal areas. *A. barbirostris* is not considered to be important in Malaya, except where it occurs in great numbers or serves as an accessory vector during an epidemic. Because of past confusion in identification of *sinensis* and *hyrcanus nigerrimus*, some doubt still exists as to their relative medical importance in Malaya. However, both have been found naturally infected there, and are thought to play a role in malaria transmission. Both species generally breed in open situations, such as rice fields, lakes, and the edges of slowly moving streams.

In addition to those mentioned above, the following species of *Anopheles* have been recorded from Malaya, or are suspected of being present in that country: *aconitus*, *aikeni aikeni*, *aikeni bengalensis*, *aikeni palmatus*, *albotaeniatus*, *annandalei annandalei*, *annularis*, *asiaticus*, *aurirostris*, *baezai*, *barbumbrosus*, *brevipalpus*, *brevirostris*, *gigas sumatrana*, *hunteri*, *hyrcanus williamsoni*, *insulaestorum*, *karwari*, *kochi*, *letifer*, *leucosphyrus hackeri*, *leucosphyrus leucosphyrus*, *lindesayi camerounensis*, *minimus varuna*, *montanus*, *palidus*, *philippinensis*, *ramsayi*, *roperi*, *schuffneri*, *separatus*, *similissimus*, *subpictus indefinitus*, *subpictus malayensis*, *subpictus subpictus*, *tessellatus*, *vagus*, *watsoni*, and *wellingtonianus*.

Of the approximately 175 nonanopheline mosquitoes known definitely to occur in Malaya, only *Aedes aegypti* and *albopictus* are the vectors of dengue fever, a common disease in Malaya. Both of these mosquitoes are urban, and they breed in all kinds of artificial containers near human habitations.

MOSQUITOES OF MEDICAL IMPORTANCE - MALAYA

FEMALES

[MALES HAVE BUSHY ANTENNAE (SEE FIG. 1) AND DO NOT BITE]

INSECT IDENT., BUREAU OF ENTOMOLOGY, U.S. DEPT. OF AGRICULTURE, WASHINGTON, D. C. AUGUST 1952

IMPORTANT: A SPECIMEN MUST HAVE ALL PARTS DRAWN FOR IDENTIFICATION

PATTERN ON FORE TARSUS
PALE BAND ABOUT AS LONG AS FORE TIBIA OR MORE BASAL SEGMENTS ENTIRELY DARK

PATTERN ON HIND TIBIA
NO PALE BAND = *ANOPHELES UMBROSUS*

WING
NOT ENTIRELY DARK FROM BASE TO FORK
VEIN 4 DARK EXCEPT FOR LIGHT SPOTS ON BRANCHES
SMALL FRINGE SPOT AT TIP OF VEIN 3
PATTERN ON HIND TARSAL SEGMENTS 3, 4 & 5 = *ANOPHELES GAMBROSIORUS*

PROLEGARIAL HAIRS ABSENT (SEE ENLARGED DRAWING FOR LOCATION) = *ANOPHELES LETIFER*

NOT MOORE = *ANOPHELES GAMBROSIORUS*

PATTERN ON HIND TARSAL SEGMENTS 3, 4 & 5
PATTERN ON HIND TARSAL SEGMENTS 3, 4 & 5 = *ANOPHELES INDETERMINATUS*
PATTERN ON HIND TARSAL SEGMENTS 3, 4 & 5 = *ANOPHELES SINENSIS*

SMALL LIGHT SPOT IN BASAL THIRD = *ANOPHELES MINIMUS*

PATTERN ON PROBOSCIS
MIDDLE SPOT ON VEIN 4 AT LEAST AS LONG AS APICAL SPOT
ALL DARK ON WHITE-TIPPED

PATTERN ON HIND TARSUS
1 BROAD AND 2 NARROW WHITE BANDS = *ANOPHELES SUNDAICUS*
2 BROAD AND 1 NARROW WHITE BANDS = *ANOPHELES MACULATUS*

PATTERN ON FEMUR & TIBIA
ENTIRELY DARK
4 NARROW WHITE BANDS
2 BROAD AND 1 NARROW WHITE BANDS
1 BROAD AND 2 NARROW WHITE BANDS
2 BROAD AND 1 NARROW WHITE BANDS

HEAD AND THORAX
WING
FRINGE
PROLEGARIAL HAIR

ADULT MOSQUITO WITH PARTS LABELED
THORAX
HEAD
ANTENNA
CLYPEUS
PALP
FORE LEG
FORE TARSUS
MID LEG
MID TIBIA
HIND LEG
HIND TARSUS
WING
ABDOMEN
EYE
PROBOSCIS

PATTERN ON THORAX
ALL WHITE = *Aedes albopictus*

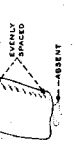
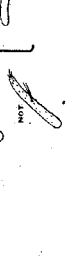
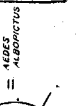
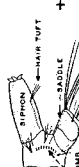
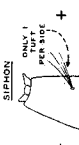
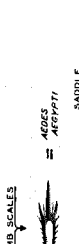
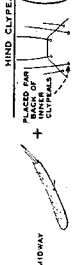
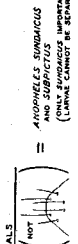
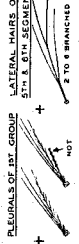
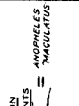
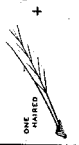
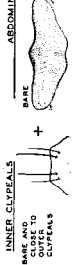
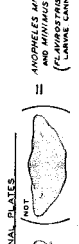
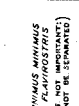
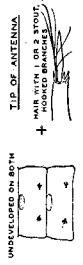
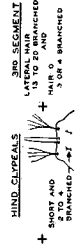
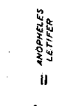
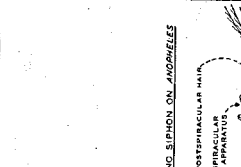
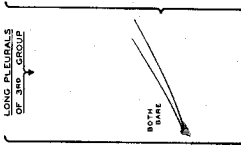
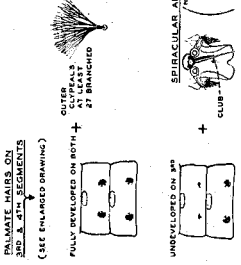
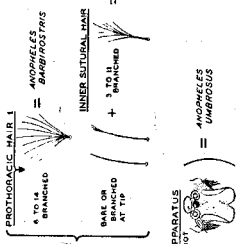
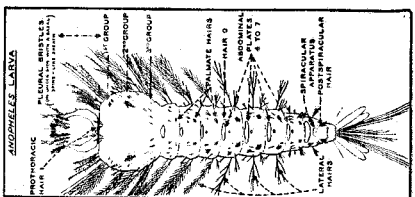
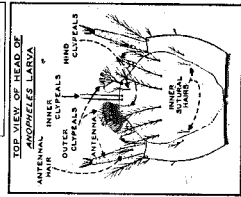
PATTERN ON HIND TIBIA
NO PALE BAND = *Aedes aegypti*

LONG PALPS ON ANOPHELES
PALPS
PROBOSCIS

SHORT PALPS ON ALL OTHERS
PALPS

MOSQUITOES OF MEDICAL IMPORTANCE - MALAYA - FULL-GROWN LARVAE

IMPORTANT - A SPECIMEN MUST HAVE ALL CHARACTERS LISTED ON THE LISTING BRISTLES



INSECT IDENT. REPT. USRA COLLECTED BY SECRETARY OF AGRICULTURE AUGUST 1912

TOP VIEW OF HEAD OF ANOPHELES LARVA

PALMATE HAIRS

ANOPHELES LARVA

INNER SUTURAL HAIR

PROTHORACIC HAIR

PALMATE HAIRS ON 3RD & 4TH SEGMENTS

LONG PLEURALS ON 3RD & 4TH GROUP

NO SIPHON ON ANOPHELES

3RD SEGMENT LATERAL HAIR

HIND CLYPEALS

ABDOMINAL PLATES

INNER CLYPEALS

SIPHON ON ALL OTHERS

PLEURALS OF 1ST GROUP

OUTER CLYPEALS

HIND CLYPEALS

ANTENNA

COMB SCALES

LATERAL HAIRS ON 5TH & 6TH SEGMENTS

ABDOMINAL PLATES

INNER CLYPEALS

ANTENNA

COMB SCALES

PLEURALS OF 1ST GROUP

OUTER CLYPEALS

HIND CLYPEALS

ANTENNA

COMB SCALES

LATERAL HAIRS ON 5TH & 6TH SEGMENTS

ABDOMINAL PLATES

INNER CLYPEALS

ANTENNA

COMB SCALES

PLEURALS OF 1ST GROUP

OUTER CLYPEALS

HIND CLYPEALS

ANTENNA

COMB SCALES