PICTORIAL KEYS TO THE MOSQUITOES OF MEDICAL IMPORTANCE

The rapid identification and separation of the mosquito species of primary medical importance is frequently a difficult problem for the field mosquito-control worker, particularly in parts of the world where literature on the subject is not available. To assist health workers in various parts of the world to meet this problem, the Department of the Army, through a transfer of funds to the Bureau of Entomology and Plant Quarantine, is developing a series of *pictorial keys* to the mosquitoes of primary medical importance. The keys indicate both the principal malaria vectors of the area and those species that are known or suspected of transmitting other diseases. The accompanying key is the first of this series.

It is hoped that these keys will serve as a rapid and convenient tool for anyone whose work requires identification of the principal species of medical importance in the area concerned, whether he be a professional taxonomist or a mosquito-control worker.

The keys are so constructed that they not only separate those species of primary medical importance for the given area, but also eliminate from consideration all other species known to occur there. However, there are serious gaps in knowledge of the mosquito fauna of many areas. Suggestions and comments will therefore be welcomed, especially from those who have an opportunity to use the keys and those with special information on the faunas of the countries.

I. KOREA

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Of the six species of *Anopheles* definitely recorded from Korea, only one is of primary medical importance. This is *Anopheles sinensis,* one of the most commonly encountered mosquitoes in Korea and an extremely efficient vector of malaria throughout that country. It is also an important intermediate host of *Wuchereria bancrofti* and has been suggested as a possible vector of Japanese B encephalitis. Characteristically, though not always, it breeds in and near rice paddies and smaller ground pools, being an open-country, fresh-water breeder. *Anopheles pattoni* and *Anopheles labranchiae atroparvus,* the latter a member of the *maculipennis* complex, have been included because their ranges may extend into this country from nearby areas where they are important vectors of malaria. The former is a brackish or fresh-water breeder, and the latter inhabits rain pools and small streams. According to available reports, *Anopheles lindesayi japonicus,* a high-altitude breeder, is a very poor vector. The remaining species of *Anopheles,* not included in this key because of their lack of importance, are *edwardsi, koreicus, pullus* (of uncertain validity) and *sineroides.*

Thirty-five species of non-anopheline mosquitoes have been recorded from Korea. Although experimental evidence has incriminated many of them in the transmission of Japanese B encephalitis, *Culex tritaeniorhynchus* is the only one so far found to be infected in nature, and it is

MOSQUITOES OF MEDICAL IMPORTANCE — KOREA

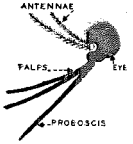
IMPORTANT
A SPECIMEN MUST HAVE ALL CHARACTERS LISTED FOR THAT SPECIES

FEMALES

[MALES HAVE BUSHY ANTENNAE ( ) AND DO NOT BITE]

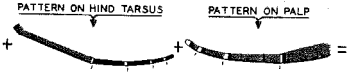
INSECT IDENT. BEPD, USDA. UNDER FUNDS ALLOTTED BY SECRETARY OF ARMY MAY 1952

LONG PALPS ON *ANOPHELES*

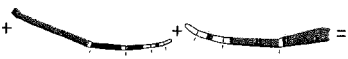


[THIS SPECIES IS NOT KNOWN FROM KOREA BUT MIGHT OCCUR HERE] = *ANOPHELES ATROPARVUS*

PATTERN ON HIND TARSUS — PATTERN ON PALP

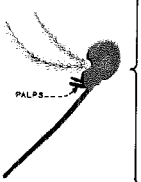


= *ANOPHELES SINENSIS*

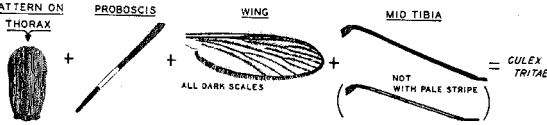


= *ANOPHELES PATTONI*

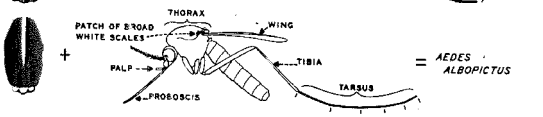
SHORT PALPS ON ALL OTHERS



PATTERN ON THORAX — PROBOSCIS — WING — MID TIBIA



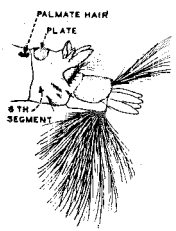
= *CULEX TRITAENIORHYNCHUS*

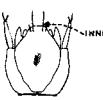


= *AEDES ALBOPICTUS*

LARVAE

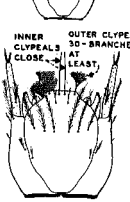
NO SIPHON ON *ANOPHELES*





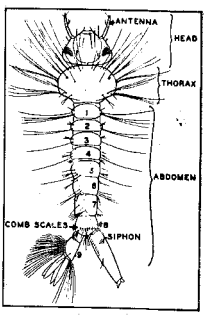
= *ANOPHELES PATTONI*

ABDOMINAL PLATE 8

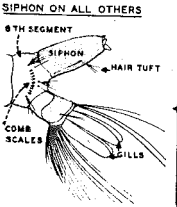


= *ANOPHELES ATROPARVUS*

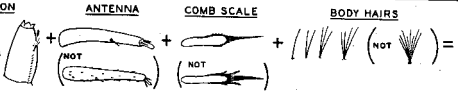
= *ANOPHELES SINENSIS*



SIPHON ON ALL OTHERS

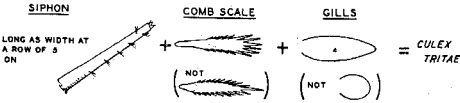


SIPHON — ANTENNA — COMB SCALE — BODY HAIRS



= *AEDES ALBOPICTUS*

SIPHON — COMB SCALE — GILLS



= *CULEX TRITAENIORHYNCHUS*

suspected of being the chief vector of that disease. It is principally a night biter, and its biting and breeding habits correspond well with the epidemiology of Japanese B encephalitis.

Aedes albopictus is commonly encountered in Korea, and is regarded as the only vector of dengue fever there. Like *Aedes aegypti*, which apparently does not occur in that country, it breeds in artificial containers near human habitations and is almost completely domestic. Dengue is not at present a common disease in Korea, but if introduced from nearby areas the presence of its vector might cause it to become important again.

II. FORMOSA

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Although 20 anophelines are known to occur in Formosa, only the 6 species treated in the keys are of primary medical importance because of their ability to transmit malaria. *Anopheles sinensis* is believed to be the principal vector in the plains throughout Formosa. It is the most prevalent anopheline and is associated in large part with rice culture in that country. Particularly in foothill regions, *Anopheles minimus* is known to be an important vector. Breeding in moving fresh water, it occurs in large numbers and is easily collected in houses and cattle sheds. *Anopheles fluviatilis*, the larvae of which cannot be separated from those of *minimus*, is not definitely known to occur in Formosa. Like *minimus*, *Anopheles maculatus* is a foothill stream breeder. In Malaya and other areas it is associated with an intense malaria, but in Formosa this species is quite rare and is included in the keys only because of its potentially great ability to transmit malaria. Three species of *Anopheles—tessellatus, annularis* and *sundaicus*—have been incriminated in malaria transmission only at certain times of the year and in restricted localities in Formosa. The first two typically breed in pools formed in sugar cane fields near the end of the rainy season and may reach high densities at that time. *A. sundaicus* breeds in direct sunlight in small pools without vegetation, such as those formed during the drying of the larger streams. It has been incriminated in the past in certain outbreaks of malaria in Formosa.

The remaining *Anopheles*, known or assumed to be present in Formosa, are *aitkeni bengalensis, barbirostris barbirostris, barbumbrosus, gigas baileyi, insulaeflorum, jeyporiensis candidiensis, kochi, leucosphyrus, lindesayi, ludlowi, splendidus, subpictus indefinitus*, and *vagus vagus*.

Of the approximately 60 nonanopheline mosquitoes, only 2 are of outstanding medical importance. These are *Aedes aegypti* and *Aedes albopictus*, both of which transmit dengue fever. Both are urban breeders, utilizing all kinds of artificial containers near human habitations.