Medically important mosquito vectors

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1. *Culex* :

-Filariasis [*Wuchereria bancrofti*]
-Arboviruses

2. *Aedes* :

-Yellow fever
-Zika
-Chikungunya
-Dengue
-Encephalitis
-Dirofilariasis

3. *Anopheles* :

- Malaria

4. *Mansonia* :

- Filariasis [*Brugia malayi*]
- Arboviruses

Vectors of medically important diseases

- *Anopheles culicifacies* – malaria - **Subfamily Anophelinae-**
- *Culex quinquefasciatus* – Wuchererian Filariasis
- *Aedes aegypti* and *Aedes albopictus* – Dengue
- *Mansonia* sp.- Brugian filariasis

Subfamily Culicinae

Anopheles species

Malaria Vectors

Main vector

- *An. culicifacies*

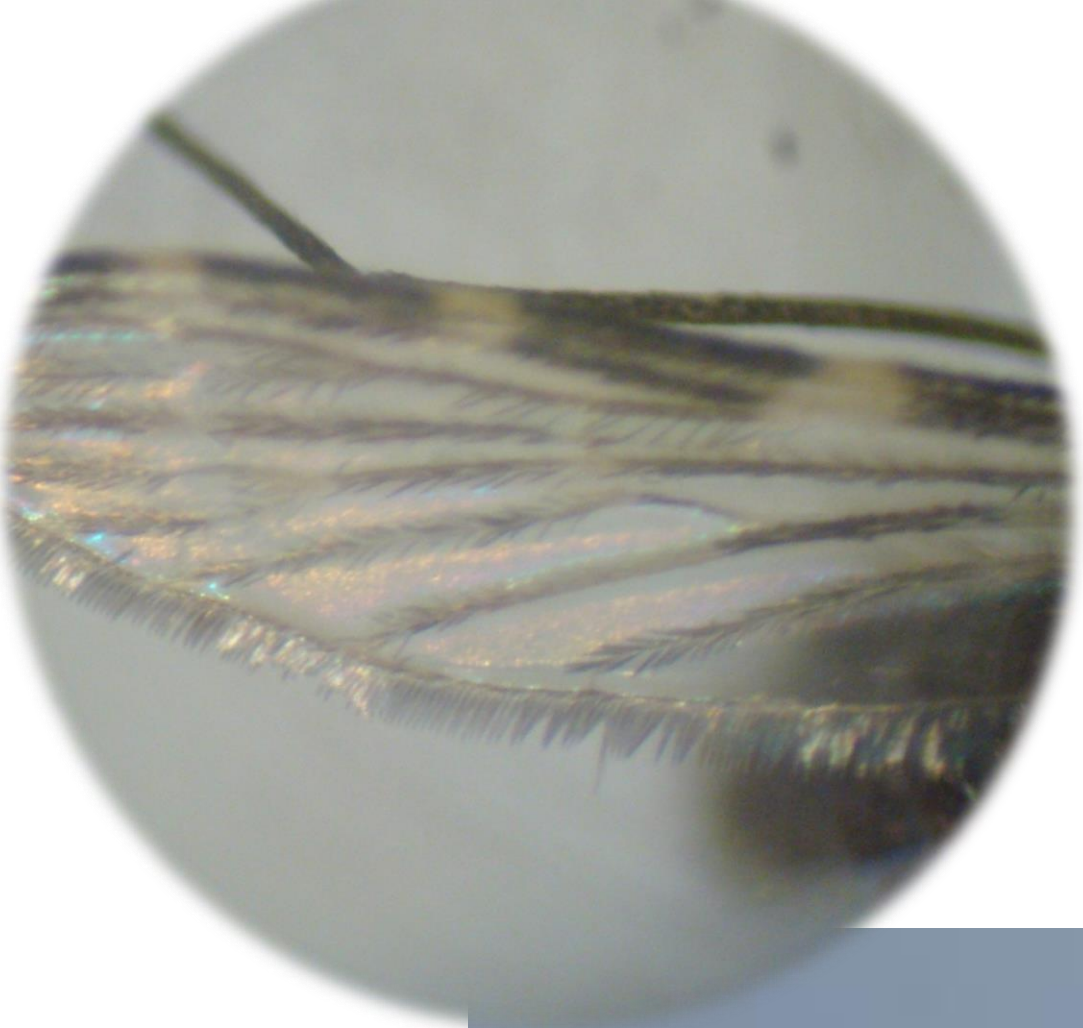
Subsidiary vectors

- *An. subpictus*
- *An. vagus*
- *An. annularis*
- *An. tessellatus*

An. culicifacies

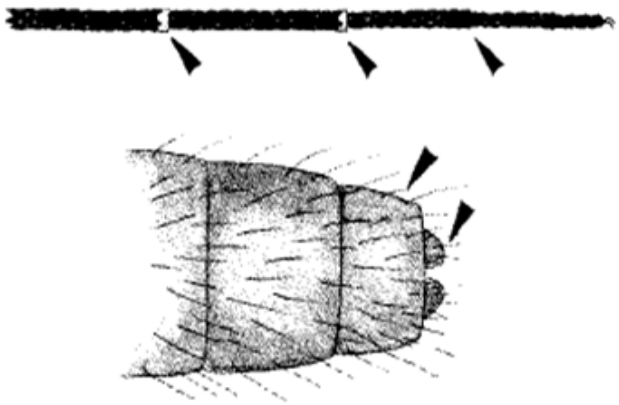
- Leg are dark (Basal pale band).
- Maxillary palpi with pre- apical dark band much longer than apical pale band.
- Remigium entirely or mostly dark scaled.
- Vein R 4+5 (3rd vein) usually dark except at the base.

Culicifacies Subgroup
An. culicifacies

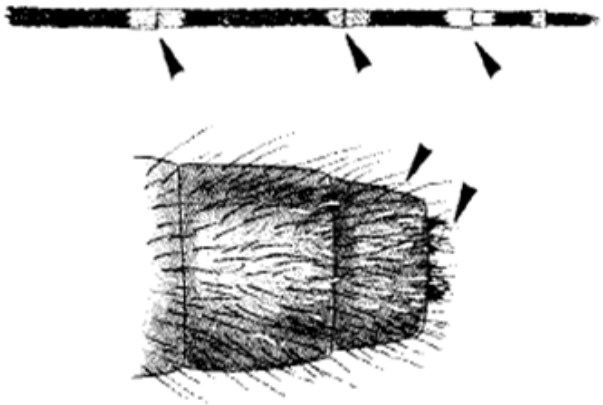


An. subpictus and *An. vagus*

- Legs with basal and apical pale bands on some tarsomeres.
- Abdominal segments Vii & Viii of female cerci at least few scales.



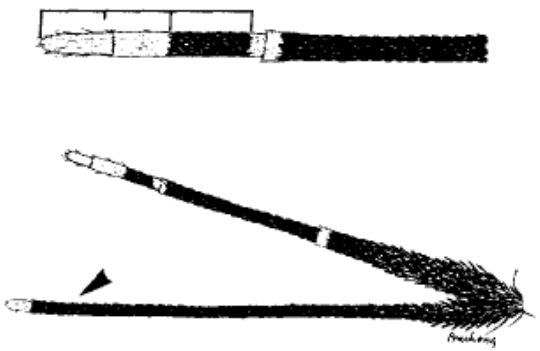
Myzomyia Series



Pyretophorus Series

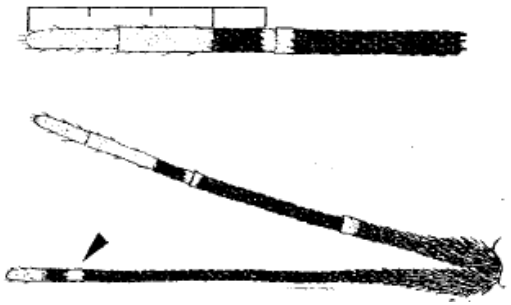
An. subpictus

- Length of the pre- apical dark and pale bands in maxillary palpi are approximately equal.



An. vagus

- Length of the pre- apical dark and pale bands in maxillary palpi are not equal (Pre- apical pale band is 3-4 times longer than the dark band.
- Proboscis with pale spot towards the apex.



An. tessellatus

- Femur and Tibia speckled.
- Apical half of the proboscis pale scaled.
- Hind tarsomere 2, 3,4 & 5 black.

Head-lateral

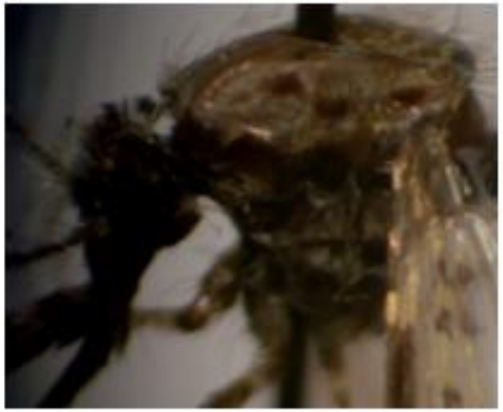
Thorax-dorsal

Abdomen-dorsal

Speckelled legs

Head-dorsal

Thorax-lateral



Wing

Hind tarsi- **All black**

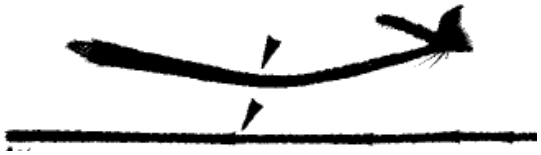
Culex species

- *Culex quinquefaciatus.*- Main Filaria vector

- *Culex tritaeniorhynchus- Main vector of* JE.
- *Culex gelidus.*- JE vector

Cx. quinquefasciatus

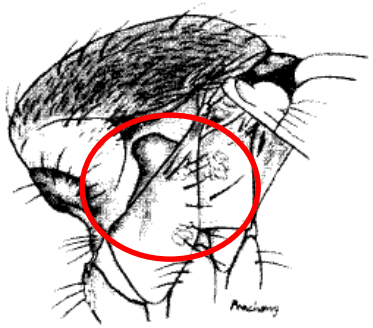
- Proboscis **without** a median pale band.



- Tarsomeres **entirely dark**.

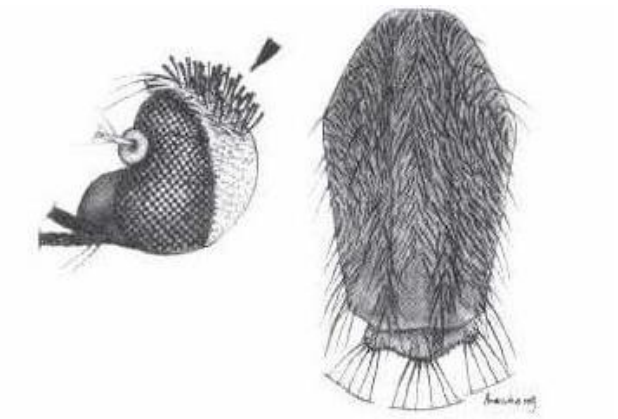
- Broad "M" shaped bands on the dorsal side of the abdomen.

- Lateral part of the thorax without a pattern of dark and pale areas.



Cx. tritaeniorhynchus

- Vertex with dark brown to black erect scales.

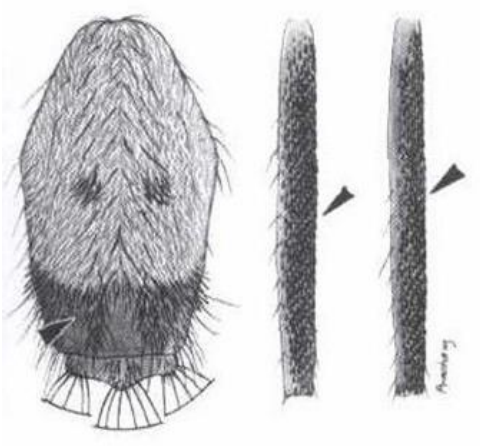


- Scutum covered with dark scales.

- Proboscis with a median pale band (extended proximally on ventral surface).

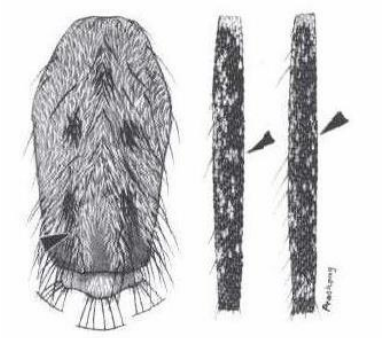
Cx. gelidus

- White scales of scutum not reaching pre-scutellar area.



- Legs without a pattern of white spots.

- Proboscis with a median pale band

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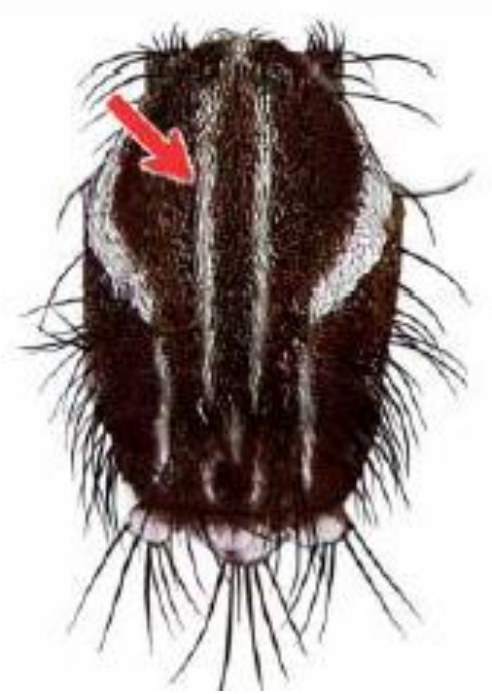
Aedes species

- *Ae. aegypti*
- *Ae. albopictus*

Ae. aegypti

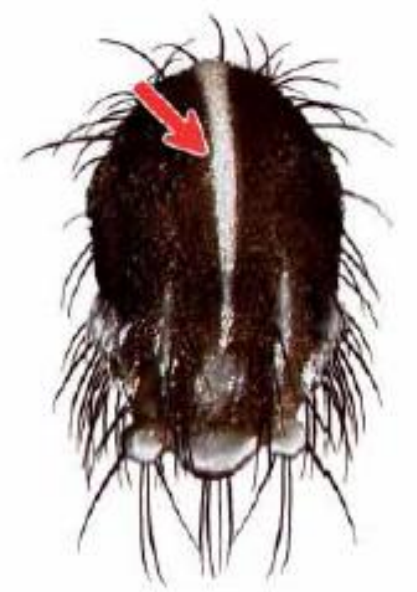
- Scutum black or brown with a pair of submedian-longitudinal white stripes.
- Mesepimeron with two well separated white scale patches.

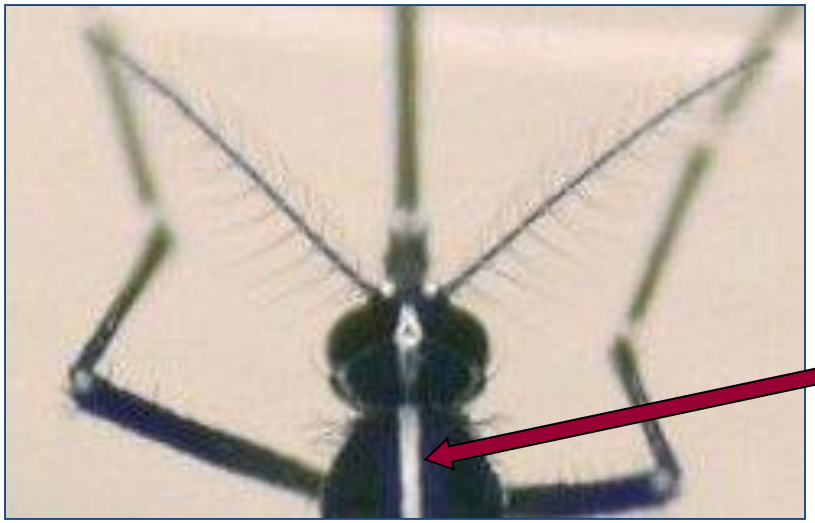


Ae. albopictus

- Scutum with a narrow a narrow median- longitudinal white stripe.

- Mesepimeron with white scale patches not separated.





Thorax has a straight white colour line

Aedes albopictus

Aedes aegepti

Genus *Mansonia*

- *Mansonia uniformis*
- *Mansonia indiana*
- *Mansonia annulifera*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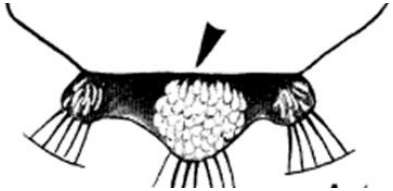
Spiracular setae absent; postspiracular setae present; wing veins with brad and asymmetrical, dark and white scales mixed

Round distinctive white spots on the dorsal side of the thorax

Dorsal side of the thorax with white scales not forming distinct round white spots

Scutellum with scales on median lobe



Ma. annulifera

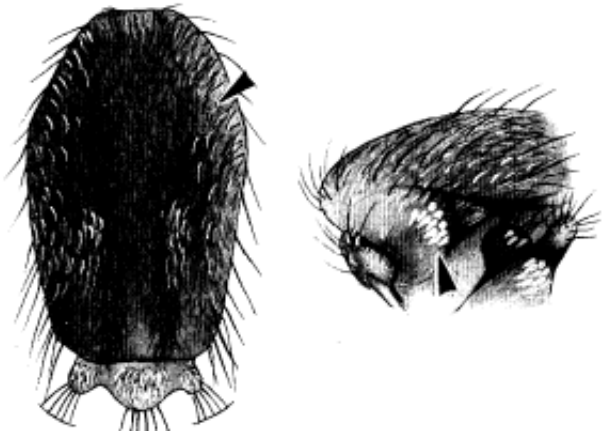
A Pair of longitudinal pale stripes on the dorsal side of the thorax.

Postpronotum with narrow pale scales.

Ma. uniformis

No longitudinal pale stripes on the dorsal side of the thorax.

Postpronotum with broad pale scales.

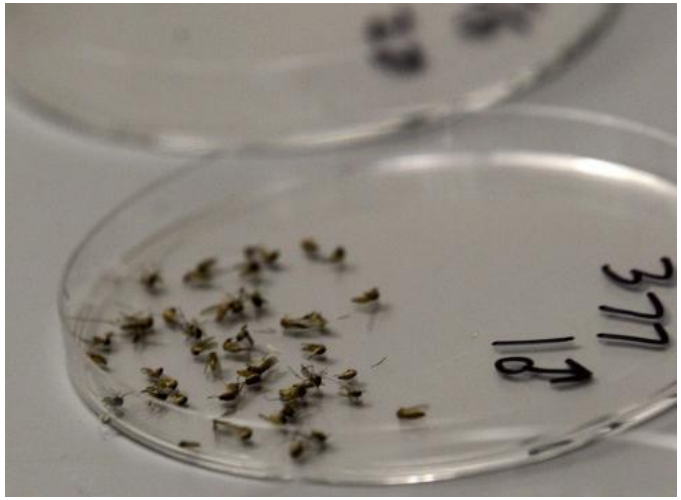


Ma. indiana

Habits or bionomics

Anopheles culicifacies	Zoophillic, nocturnal endophagic (mosquito that feeds indoors) and exophagic (mosquito that feeds outdoors), after blood meals rests indoors (endo phillic), rests at an angle to the surface, eggs laid singly, small collections of shallow sunlit clear slow moving water. , In dry zone, small tanks, ponds, shallow gem pits, cart tracks, hoof marks etc.
Culex quinquefascisatus	Nocturnal, endophagic and exophagic, highly anthropophillic (Preferring human beings to other animals), females rests behind clothes, under furniture, eggs laid in polluted water that is stagnated, foul smelling, and contaminated with organic material in catch pits, latrins, cess pools, blocked drains etc.
Aedes aegypti and Aedes albopictus	Day biters, endophagic and exophagic, highly domesticated species, Adults found close to human habitation., lay eggs in temporary collections of rain water, discarded tins cans, flower vases, coconut shells, tyres, leaf axils, , eggs laid singly resists drying for months.
Mansonia annulifera and Mansonia uniformis	Nocturnal, exophagic, , enter human dwelling for blood meal, breeds in permanent collections of water such as swamps, and lakes with vegetation eggs on under surfaces of plants like *Pistia,* and *Salvinia*.

Mosquito Surveillance Techniques



Adult collection techniques

Cattle Baited Hut Collection (CBHC)

Cattle Baited Net Collection (CBNC)

Window Trap Collection (WTC)

Hand Collection- Indoor (HC)

Pyrethrum Spry sheet Collection (PSC)

Light trap

Biogents (BG) sentinel trap

Larval collection

Ovitrap method

Siphoning method

Standard dipping method

Common indices to measure the density level of immature mosquitoes

1. **House index (HI):** percentage of houses infested with larvae and/or pupae.

$$\text{HI} = \frac{\text{Number of houses infested}}{\text{Number of houses inspected}} \times 100$$

2. **Container index (CI):** percentage of water-holding containers infested with larvae or pupae.

$$\textbf{CI} = \frac{\text{Number of positive containers}}{\text{Number of containers inspected}} \times 100$$

3. **Breteau index (BI):** number of positive containers per 100 houses inspected.

$$\textbf{BI} = \frac{\text{Number of positive containers}}{\text{Number of houses inspected}} \times 100$$

4. **Pupal index (PI):** number of pupae per 100 houses

$$\textbf{PI} = \frac{\text{Number of pupae}}{\text{Number of houses inspected}} \times 100$$

Thank You!