Entomological features & vector control measures of Asian vectors which make them amenable to indoor & outdoor control

Pradya Somboon, PhD

Department of Parasitology, Faculty of Medicine, Chiang Mai University, Chiang Mai, Thailand
Asian malaria vectors

**Dirus Complex** (Sallum et al., 2005)

- *An. baimaii*  Sallum & Peyton *
- *An. cracens*  Sallum & Peyton *
- *An. dirus*  Peyton & Harrison *
- *An. elegans*  (James)
- *An. nemophilous*  Peyton & Ramalingam
- *An. scanloni*  Sallum & Peyton *
- *An. takasagoensis*  Morishita

**Leucosphyrus Complex** (Sallum et al., 2005)

- *An. balabacensis*  Baisas *
- *An. introlatus*  Colless *
- *An. latens*  Sallum & Peyton *
- *An. leucosphyrus*  Dönitz *
Human and primate malaria vectors in forested areas

Dirus Complex

Leucosphyrus Complex

India
Myanmar
Vietnam
Laos
Hainan Island
Andaman (India)
Cambodia
Thailand
Malaysia
Sumatra
Borneo
Indonesia
Java
Sulawesi
Human malaria vectors in forests and forest fringe areas

**Minimus Complex** (Green *et al.*, 1990)

- *An. harrisoni* Harbach & Manguin (species C)
- *An. minimus* Theobald (species A)
- *An. yaeyamaensis* Somboon & Harbach (species E)

![Map of human malaria vectors in forests and forest fringe areas](image)
**Maculatus Group** (Rattanarithikul & Green, 1987)

- *An. pseudowillmori* (Theobald) *
- *An. willmori* (James) *

**Maculatus Subgroup** (Rattanarithikul et al., 2006b)

- *An. dispar* Rattanarithikul & Harbach
- *An. dravidicus* Christophers
- *An. greeni* Rattanarithikul & Harbach
- *An. maculatus* Theobald *

**Sawadwongporni Subgroup** (Rattanarithikul et al., 2006b)

- *An. notanandai* Rattanarithikul & Green
- *An. rampae* Harbach & Somboon, 2011
- *An. sawadwongporni* Rattanarithikul & Green *
Human malaria vectors in forests and forest fringe areas

An. maculatus
An. pseudowillmori
An. willmori
An. sawadwongporni
An. notanandai
An. dravidicus
An. dispar & An. greeni
Human malaria vectors in coastal areas

Sundaicus Complex (Sukowati et al., 1999)
- An. epiroticus Linton & Harbach
- An. sundaicus (Rodenwaldt)
- An. sundaicus (D and E) (Dusfour et al., 2007)
Forest related malaria vectors

Dirus and Leucosphyrus Complexes

Breeding habitats

Ground pool, rock pool, animal foot prints, stream margins, in dense forest, foothills, forest fringe

Behavioural features

- Contact avoidance to residual insecticide
- Feeding on human and primates, exophagic on the ground and above the trees
- Shift of biting time
Forest related malaria vectors

Minimus Complex

Breeding habitats
Stream margins, hilly forest, foothills, forest fringe

Behavioural features
- Plasticity
- Contact avoidance to residual insecticide
- Exophagic, zoophilic in human settlements
- More endophagic and anthropophilic in farm huts or shelters in forest
Forest related malaria vectors

Maculatus Group

Breeding habitats
Stream margins, ground pools, rock pools, hilly forest, foothills, forest fringe

Behavioural features
- Plasticity
- Zoophilic, exophagic in human settlements
- More endophagic and anthropophilic in farm huts or shelters in forest
Foci of transmission related to forest settlements, forest and agricultural activities, movement of people and forest border areas.

**Recommended control strategy**
- Indoor residual spray – small impact
- Repellent and treated bednets – for personal protection
- Active and passive case detections, and prompt treatment
- Improve transportation and security
- Health education
Increased biting on human if lives close to cattle
Island and coastal malaria vectors

Sundaicus Complex

Breeding habitats
Brackish and fresh water, shrimp/fish ponds, ground pools, stagnant water, mangrove, swamp

Behavioural features
- Plasticity
- Biting both human and cattle, indoors and outdoors
Epidemiology and control of coastal malaria

Foci of transmission related to coastal and inland environmental situations, occupation, shrimp and fish farms, labourers and fishermen.

**Recommended control strategy**
- Repellent and treated bednets – for personal protection
- Active and passive case detections and prompt treatment
- Health education
Thank you